



Editor 'fiddles'
as globe warms

EDITORIAL

INDEPENDENT GAMETOPHYTES of Killarney fern have claimed our attention for twenty years. We became aware of them thanks to Don Farrar's fascinating paper about the phenomenon in the USA delivered at a conference in Edinburgh back in the 1980s, and subsequent searches of our own islands have shown them to be widespread and much commoner than the very rare sporophyte.

Now pteridologists are finding Gametophytes bearing tiny sporophyte-lings and we need to keep our wits about us, for we will surely find more of them. They offer a unique opportunity that bustards, beavers and woodsia cannot. It should be possible for conservationists to re-establish *Trichomanes* with genuine local genes at sites where it used to grow in the past. For the first time, we have in this issue (page 141) an excellent illustrated guide to what they look like. A clear message is that early stages are very, very small, so a hand lens will be more than useful, but also remember to carry a torch on fern forays; something I habitually forget and regret.

CLIMATE CHANGE is constantly in the news, apparently taken seriously by the media and politicians, but more often than not eclipsed by more pressing matters such as footballers' metatarsals, character assassination by judgemental journalists of the socially wayward and the relentless pursuit of prosperity. Gardening gurus chuckle as they predict opportunities climate change will offer the gardener. At best, CO₂ will be added to the atmosphere at the present rate and people will continue to pursue voracious consumption, in accordance with their perceived rights. Meanwhile, wise environmentalists will bash their well-informed heads on metaphorical brick walls as politicians and public make light of the dangers we face if we don't pull up our socks now.

In the coming few decades it is likely that unprecedentedly rapid climatic change will have an undesirable impact on all living creatures, so how soon will we notice ferns in distress? Heather McHaffie's article (page 162) suggests now! As in all predictive science, there is bound to be a degree of uncertainty in Heather's considered conclusions (and, as an eye-witness, mine too), but it seems that our rare alpine lady ferns might already be under threat of extinction, and might disappear soon. These unfortunate plants have been established in the Scottish Highlands for less than 10,000 years and they might be among the first noticeable organisms to disappear entirely as populations of British birds, insects, wild flowers continue their inexorable decline, and weeds and aliens take their place. I wonder if, as world climatic conditions change, the genes for our rare endemic var. *flexile* will be expressed by *Athyrium distentifolium* growing elsewhere ... before those populations themselves go extinct?

MIDSUMMER MYTH or unacknowledged science? Can you use fern spores to become invisible? Well, here's how it's done, provided by Adrian Dyer, so that you can try fern magic for yourself (page 157).

TREE FERNS never fail to fascinate, so we have our regular Tree-Fern Newsletter on page 144. They also feature prominently in in Sheila Tiffin's description of her woodland garden (page 147) and Billy Alexander's account of a visit to the Juan Fernández Islands off the coast of Chile, the location of the Robinson Crusoe story (page 151). I'm not a tree fern fanatic, but I'd soon become one if I found myself in the *Blechnum cycadifolium* 'forest' in Billy's picture of Mirador Selkirk.

ADVICE FOR AUTHORS is laid out below, but it seems that some contributors think it irrelevant. It's a nuisance to have to remove those difficult-to-find double spaces and correct silly errors. Authors, please do your job properly so that your editor can concentrate on his. The copy deadline I set each year has become meaningless, so I've scrapped it. Please just send me copy as soon as it's ready.

James Merryweather

authors, please read

ADVICE FOR AUTHORS

Pteridologist welcomes contributions written in English on all aspects of the natural history and horticulture of ferns and related plants, indeed, anything fern-wise that will be enjoyed by a wide range of readers. Please refer to past editions for ideas regarding scope and presentation.

SCRIPT: Ideally text should be provided in the form of a WORD, RTF or TEXT file on a floppy disc, CD-ROM (PC or MAC) or e-mailed. I can scan typescripts and, if I must, even type spidery manuscripts. However, surely it is not the editor's job to sort out basic use of English. Authors are expected to use reasonably correct **splelngg**, **Grammer** and **punc;tua.tion**, and write in such a way that the **meaning** of the words is conveyed.

One space between sentences and (I never thought I'd need to mention this) one space between words, please. 2006: *I still need to mention it!*

CONVENTIONS: Scientific names should be in italics thus: *Polystichum setiferum*, (if typed or in manuscript, underlined). Variety names should be in normal type, capitalised and enclosed in single inverted commas thus: *Polystichum setiferum* 'Plumoso-divisilobum'. Common names should be in lower case thus: soft shield fern.

ILLUSTRATIONS: As JPEG etc., but I have scanners so please send line art, good photo prints (accompanied by their negatives) or 35 mm slides which I will return. If supplying silhouettes ensure they are not of squashed and shrivelled fronds, but actually look like the fern they came from, and are of decent quality. Send files larger than ~500Kb on floppy disc or CD-ROM please, not by e-mail. **COPY DEADLINE? I give up! a.s.a.p.**

PLEASE: check your contribution thoroughly for errors and ensure you have adhered to these simple procedures before you send it.

To discuss your ideas: ☎ 01599 566291; ✉ pteridologist@ebps.org.uk (or write a letter)

PTERIDOLOGIST 2006

CONTENTS

Volume 4 Part 5, 2006

MISSOURI BOTANICAL GARDEN

OCT 20 2006

GARDEN LIBRARY

EDITORIAL

Instructions to authors

James Merryweather

NEWS & COMMENT

A Royal Fern Mystery
Artefacts Incorporating Ferns
Bracken Superstitions
New Law to Fight Bracken Menace
Teachers' Howlers
From the President's Collection
Barcodes for Botanists
New Fern Website

John Edgington 134
Yvonne Golding 134
Jack Bouckley 135
Open Spaces Society 135
I M McAnon 136
Adrian Dyer 136
Alastair C. Wardlaw 137
Roger Golding 150

IN THE GARDEN

Ferns in My Garden: *Bracken & Filmy Ferns*
Air Pollution and Evergreen Ferns

Jack Bouckley 139
Alistair Urquhart 140

IDENTIFICATION

Have You Seen This Plant?
Young sporophytes of *Trichomanes speciosum*

Anon. 141

TREE-FERN NEWSLETTER No. 12

Tree-Fern News
Tree Ferns in a Small Garden
Three Years (plus) of Convalescence!
Tree Ferns in a Cornish Woodland

Alastair C. Wardlaw (ed.) 144
Alastair C. Wardlaw 144
Mark Longley 145
Alastair C. Wardlaw 146
Sheila Tiffin 147

FEATURES

Journey to the Juan Fernández Islands
How To Record Ferns
Fern Spores Are Magic
Alpine Lady Ferns:
are they suffering with climate change?

Billy Alexander 151
Chris Page 154
Adrian Dyer 157
Heather McHaffie 162

BOOK REVIEWS

Ferns of Northeastern and Central North America by Cobb, Farnsworth & Lowe
Polystichum Cultivars by Dyce

Graham Ackers 138
Graham Ackers 149

COVER PICTURE:

The British endemic alpine lady fern *Athyrium distentifolium* var. *flexile* photographed by the editor in a corrie in the Scottish Grampian Mountains above Bridge of Orchy whilst accompanying Dr Heather McHaffie on what turned out to be a distressing field visit - see page 162 & editorial.

PHOTO: JAMES MERRYWEATHER



Unless stated otherwise, photographs were supplied by the authors of the articles in which they appear.

DISCLAIMER:

Views expressed in *Pteridologist* are not necessarily those of the British Pteridological Society.

Copyright © 2006 British Pteridological Society. All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing it in any medium by electronic means) without the permission of the British Pteridological Society.



Dutch Rush
Equisetum hyemale

NEWS & COMMENT

LETTERS

A Royal Fern Mystery

John Gerard's *Herball* of 1597 is notable less for its botanical accuracy, which was greatly improved by Thomas Johnson in his revised edition of 1633, than its vignettes of Gerard's Elizabethan world. An intriguing example occurs in his description of *Osmunda regalis*. After a delightfully naive description of its general appearance:

These leaves are like the large leaves of the Ash tree; for doubtless when I first saw them afar off it caused me to wonder thereat, thinking that I had seene yong Ashes growing upon a bog.

Gerard mentions a couple of places where *Osmunda* grows (or grew – the only Royal ferns at these sites now are introductions).

It groweth in the midst of a bog at the further end of Hampsted heath from London, at the bottom of a hill adioning to a small cottage, and in divers other places, as also upon divers bogges on a heath or common neere unto Bruntwood in Essex, especially neere unto a place there that some have digged, to the end to finde a nest or mine of gold; but the birds were over fledge, and flowne away before their wings could be clipped.

To this Johnson added, in 1633:

It did grow plentifully in both these places, but of late it is all destroyed in the former.

Newman, in his *History of British Ferns* (1854) writes, on unstated authority, that Gerard's Essex site was "Kavanagh Wood".

This famous passage is often quoted, especially in relation to Hampstead Heath, but I have seen no explanation of the mysterious goings-on in the Essex bog. Neither Gibson (1862) nor Jermyn (1974), in their floras of Essex, attempt to elucidate the meaning, though both quote it, as does Britten in his *European Ferns* (1881) with the comment that this is "an amusing reference". Surely Brentwood was not the site of an early gold rush! Can any reader enlighten me about this cryptic comment of Gerard?

John Edgington
19 Mecklenburgh Square
London WC1N 2AD

Artefacts Incorporating Ferns

If you are ever in south Devon then visit Overbecks house and gardens. The scientist and inventor Dr. Otto Overbeck lived there between 1928 and 1937 when he donated the property to The National Trust.

From the gardens magnificent views can be had of Salcombe and the dramatic Devonshire coastline. These enjoy a sheltered, oceanic microclimate and so are full of Mediterranean and sub-tropical exotics including some good specimens of *Dicksonia antarctica*. The house has been converted into a small museum housing Otto Overbeck's eclectic collections of his own inventions, a nautical collection and a most interesting natural history collection.

What caught my eye, however, was the red tiled fireplace in the entrance hall with the fern fire screen. You can see from the photograph that it is composed of two glass plates set in a bamboo frame between which is a collection of pressed fronds. Like Dr. Overbeck's collection, it is an eclectic mix of species though I've just heard from The National Trust that in fact the screen was donated by a Miss Morton of Plymouth. Does anyone know of her?

Yvonne Golding
7 Grange Road
Buxton SK17 6NH



Please write and tell us about your discoveries of interesting or unusual ferny artefacts (about 200 words) accompanied of course by a photo - eds.

BRACKEN SUPERSTITIONS

Some additional contributions from Jack Bouckley



J.B. Smith's article *Bracken Lore* (*Pteridologist*, 2005) prompted me to check some articles I had read in the past. It seems that, in the seventeenth century, Bracken was a cause for superstition. For example, Charles I believed bracken burning could cause rain. He had the following letter sent to the High Sheriff of Staffordshire:

Sir,-- His Majesty taking notice of an opinion entertained in Staffordshire, that the burning of sferne doth draw downe rain, and being desirous that the country and himself may enjoy fair weather as long as he remains in those parts, His Majesty hath commanded me to write vnto you, to cause all burning of sferne to bee forborne, until his Majesty be passed out of the country. Wherein not doubting but the consideration of their own interest, as well as that of his Ma^{ties}, will inuite the country to a ready obseuance of his Ma^{ties} command, I rest,

Your very loving friend,
PEMBROKE AND MONTGOMERY.

Belvoir, 1st. August, 1636.

In *'European Ferns'* (1880), James Britten relates that in some parts of Shropshire it was thought that the Bracken bloomed with a blue flower on Midsummer eve and this flower died off at dawn.

Russian peasants also believed this and that the finding of the flower would bring luck. Naturally (or supernaturally) the flower produced seed which had rather magical powers and there is a story told of a man who went out one Midsummer night to look for a lost foal.

While searching he went through a meadow in which fern seed was ripening and some fell on his shoes. He went home, entered his house but nobody saw him so he said, "I have not found the foal". All those in the room started because they heard him but could not see him. His wife, thinking he was playing some sort of trick on them called to him and he straight away went and stood in the middle of the room and said, "Here I am, right before you, what do you want?" This frightened everyone as they had heard his footsteps and also heard his voice but saw no-one. The man became aware that he was invisible and the thought struck him that he may have fern seed on his shoes. He removed them and immediately became visible again.

There are more practical hints for achieving invisibility using 'ferne seed' on page 157

BRACKEN NEWS

sent in by Martin Spray

NEW LAW TO FIGHT BRACKEN MENACE We are advocating a change in the law to require commoners to deal with the increasing encroachment of bracken on open country. The government's Commons Bill, currently in the House of Lords, should be amended to require the proposed new commoners' associations to have a duty to manage bracken, and to remove a specified hectarage of bracken each year.

Says our general secretary, Kate Ashbrook: "Bracken is a huge problem, especially in the uplands. It spreads rapidly and its rhizomes churn up the soil. With changed agricultural practices and fewer animals on the land the bracken is no longer being trampled and kept under control. Bracken is a threat to animal and human welfare. It harbours ticks which carry diseases such as Louping-ill and Lyme disease. It can ruin people's enjoyment of the land during the summer months, because you can't walk through tall bracken or see where you are putting your feet. It reduces the biodiversity of the land, because few species thrive in areas covered in bracken.

"It endangers archaeology because it can damage and disturb archaeological remains under the soil. Excavations in bracken-ridden areas have revealed that the disruption caused by the enormous mat of rhizomes under the soil is such that Bronze Age remains are found above medieval ones. The evidence of our history is being made changed from carefully ordered strata to a mélange.

continued overleaf

NEWS & COMMENT

"A lot of research, both here and internationally, is being done into bracken control, and no one really has the answer. But there are many examples of good practice", explains Kate. "Take Dartmoor in Devon for example. On the western edge of the moor the Brentor Commons Association has purchased a bracken bruiser. They crush the bracken twice a year. It has already made a difference to the bracken growth. Meanwhile, commoners on Holne Common on south-east Dartmoor have obtained a bracken crusher and are attacking bracken on their common three times a year. It is not as good as animals' feet, but it's much better than nothing. And with support from the Dartmoor National Park Authority's Sustainable Development Fund, the Dartmoor Preservation Association is testing various methods of bracken control on the archaeological features on its land at High House Waste, and on other sites on Dartmoor.

"We believe there should be a coalition of landowners, graziers, animal welfare bodies, nature conservation organisations, recreational users and archaeologists to promote a solution to the bracken problem. We hope the amendment to the Commons Bill, which will be proposed by Lord Greaves and debated in the House of Lords Grand Committee in early November, will fuel the debate."

Open Spaces Society <www.oss.org.uk>

TEACHERS' HOWLERS

Now that lower plants have almost disappeared from the University Curriculum, writing exam questions about pteridophytes is rapidly becoming a lost art. It is therefore interesting to look back at past papers to see what 20th century students were expected to know and how their knowledge was tested at a time when the preparation of exam papers in this area had reached its zenith. For example:

UNIVERSITY OF ENIDBOROUGH [sic] BOTANY SPECIAL SUBJECT: PTERIDOPHYTES

Answer one question at a time. When writing your answers, use both sides of the paper.

- Q.1. Write an essay on the fronds of *Pilularia*.
- Q.2. Using your microscope, make a drawing of a section through a sporangium.
- Q.3. After immersion in liquid nitrogen, report on the effect of low temperature on the viability of stored spores.
- Q.4. Explain how periods of darkness throw light on the processes controlling spore germination.
- Q.5. Do you know why prothalli of some species have glandular hairs?
- Q.6. Explain how you could demonstrate sexual reproduction in a dense stand of bracken.
- Q.7. Describe and discuss the difficulties of carrying out palynological analyses in a bog.
- Q.8. With reference to ferns of man-made habitats, write notes on walls.
- Q.9. Discuss the basis for the classification of Linnaeus within the Polypodiaceae.

I M McAnon.

From the President's Collection

We are privileged to have a peep into Adrian Dyer's fern archive, from which he has sent a newspaper cutting showing the *Tour de France* making its way through the French countryside. Since the cyclists are able to observe and wave, the race must be at a low-competitiveness stage.

Each of the inexplicably nude spectators is attempting to maintain decency by covering his privates with a generous bunch of bracken.

WEEKEND SPORT

THE SCOTSMAN SATURDAY, 20 JULY 1996

Page 28



Barcodes for Botanists

Alastair Wardlaw

92 Drymen Road, Bearsden, Glasgow G61 2SY (a.wardlaw@tiscali.co.uk)



THE BARCODE OF LIFE

IDENTIFYING SPECIES BY DNA

<http://phe.rockefeller.edu/barcode>

This 'Barcoding' is a futuristic scheme for identifying plants by marrying DNA-sequencing technology and mobile-phone electronics to be used by both botanists and non-botanists. I was one of those privileged to have a preview by attending the conference at the Natural History Museum in London on 24 May, 2006. A lot of research still has to be done but if the project is successful then in 5-10 years time there will be a transformation in how plants are identified. The method will work with portions of plants and should therefore find application in trade regulation, horticulture, forensics and herbal medicines, as well as in field botany.

So, with a crystal ball cupped in my hands, I now fast-forward to a field excursion in 2011-2016. The barcoding machine might be around four times the size of a mobile phone and easily taken into the field. On arriving at the plant specimen to be identified, a small disc of leaf is cut and popped into the machine. Thereafter it is automatic.

The machine grinds the leaf sample and extracts the DNA. It then amplifies and sequences one or more carefully pre-selected genes. The sequence is sent by the in-built mobile phone to a central database where the DNA sequences of all the vascular plants in the British flora are stored. After matching the sample with one of the stored sequences, the identified name is sent back to the user and appears on the screen of the barcoding machine. All this in maybe 15 minutes.

The system, if it can be made to work, would allow non-botanists to put a species name to all the plants in the British flora. It would also help specialists to identify immature plants and 'difficult' groups like the grasses and sedges (and ferns!). The British flora is seen as especially suitable for validating the barcode approach because it is so well described and is of reasonable size, species-wise.

Although the focus of the recent meeting was on British plants, the barcoding procedure is also being applied to animals, particularly insects. Here there is a lot of interest in the accurate identification of useful species such as honey bees, and also pest species that attack plants, and disease vectors such as mosquitoes. Barcoding works with immature and larval forms, and body fragments. With plants, the barcoding technology should thus allow analysis of animal feeding habits by identification of plant fragments in stomach contents.

The project is being driven by a consortium of scientists at the Natural History Museum in London (led by Johannes Vogel) and at The Royal Botanic Gardens at Kew and in Edinburgh. This type of inter-institutional collaboration is very much favoured by the grant-giving bodies. The British researchers in turn are part of the worldwide CBOL, the

Consortium for the Barcode of Life. 'Barcode of Life' is defined as: 'A short DNA sequence, from a uniform locality on the genome, used for identifying species'.

Several speakers at the meeting emphasized that although Barcoding involved the sequencing of DNA, its intention is *not* to generate a DNA-based taxonomy. Instead it is restricted to identifying a plant specimen to species level. It is not in the business of defining phylogenetic or evolutionary relationships. Nor will barcoding attempt to sequence a whole genome.

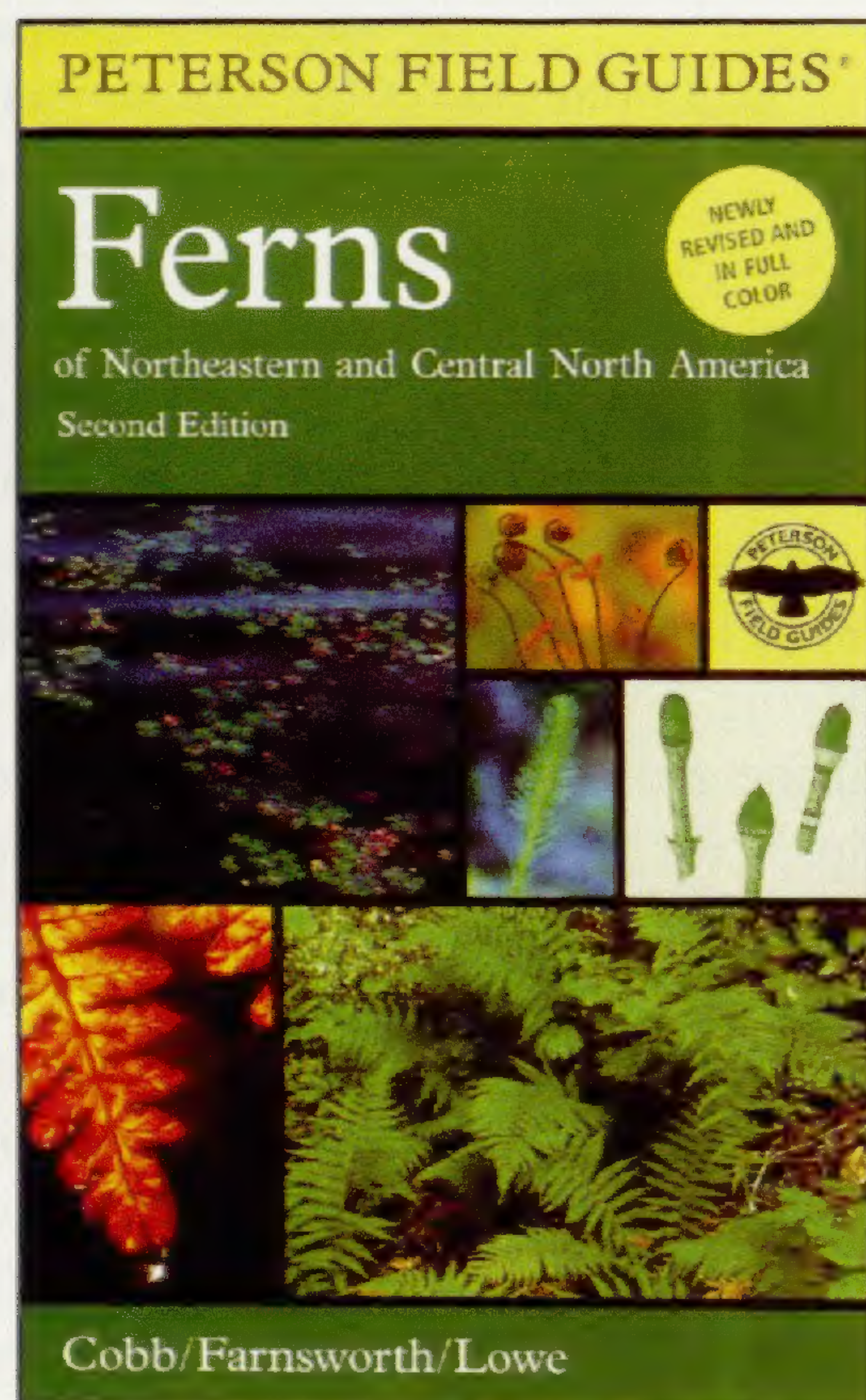
The first step for the British scientists has been to choose a suitable gene. Two main criteria must be met: the gene must be present in all the plant species that are potential subjects for identification; and it must have sufficient variation in the sequence of its DNA bases (A, T, G and C) for each species to be unique. A wide search is currently taking place, for although there are plenty of widely shared genes among the British vascular plants, they mostly do not vary enough *between* species to allow each to have a unique barcode. So far the research has uncovered some promising possibilities, but without a decisive front-runner.

After the candidate gene has been chosen, the next stage will be to record its barcode sequence in each of the vascular plant species in the British flora. Thereafter the project would move into its final stage of checking that it actually works under field conditions and in forensics, etc. In parallel with the researches on the DNA and botanical aspects, engineers and computer scientists will develop the leaf-processing technology, informatics and electronics for the barcode machine.

Somewhat to my surprise the NHM conference also considered non-scientific issues. Speakers from the University of Lancaster highlighted some of the sociological/political aspects. For example, the barcode machine would 'empower' ordinary citizens to replace experienced field botanists for projects such as impact assessment of housing schemes and motorways on wild flora. The problems created by the loss of plant taxonomists through retirement and non-replacement would be solved by the barcoding machines. Nevertheless there would still be the need for highly competent taxonomists to identify accurately the plants used to compile the central database. Users, however, would need little more skill than a supermarket checkout operator. Instead of sliding the packet of cornflakes across a laser beam, they would pop a disk of leaf into the barcode machine.

I suppose what we call 'progress' frequently involves 'de-skilling', which is soon taken for granted by the next generation. Who regrets loss of the skill for milking a cow, when you can buy a carton of milk almost anywhere?

BOOK REVIEW



FERNS of Northeastern and Central North America

by Boughton Cobb, Elizabeth
Farnsworth and Cheryl Lowe

Peterson Field Guides, 2nd ed., 2005
ISBN 0-618-39406-0 (~£10)

Reviewed by
Graham Ackers

keys the two species are differentiated by characteristics of frond shape, glandular hairs and bulblets. This is fine as far as it goes, but unfortunately our field population contained intermediates of *C. tennesseensis* back-crossing with *C. bulbifera*. This caused some of us considerable difficulties with identification as not all the specimens were equal in their sharing of their parental characters. The field guide would not be helpful in such situations as non-fertile hybrids are not covered. However, for most of the taxa that are covered, both the species and generic descriptions are very full and most helpful. As a further example from *Cystopteris*, the generic account carefully describes the indusial, vein and stipe characters that distinguish the genus from *Woodsia*. I have no doubt that experienced North American based fern folk would be able to cite many more helpful examples enabling accurate taxa differentiation.

Although I still have a soft spot for John Mickel's 1979 book "How to Know the Ferns and Fern Allies", the present work must now be the best available field guide to the ferns of this region, maintaining the Peterson Field Guide pattern of continuous improvement practised since their first appearance back in 1934. Highly recommended.

It seems hard to believe that the first edition of this seminal work was published as long ago as 1956, authored by Boughton Cobb. Valuable as the original work was, this new edition is considerably larger benefiting from a number of improvements including - the additional expert authorship of two members of the New England Wild Flower Society, additional illustrations by one of the new authors Elizabeth Farnsworth (whilst retaining most of the original sensitively executed drawings by Laura Louise Foster), sensibly deployed good colour photographs, up to date nomenclature and an updated bibliography (as one might expect), the new sections "Fern Habitats and Conservation", "Ferns in Cultivation and Culture" and a "Glossary" of botanical terms.

Those sections common to both editions cover life cycles, taxonomy, habitats, conservation, morphology, field guide use, and keys. Four sections from the original edition have been dropped - "The Ferns and Their Allies of the British Isles and Western Europe", "Ferns in the Flower Garden", "The Ferns and Their Allies in the Past", and "A Life Size Restoration of a Swamp Forest of the Coal Age". Interesting though these were, their relevance to this field guide was obviously considered to be marginal.

In describing the Peterson Identification System, the publicity material on the back cover informs us that "Roger Tory Peterson's unique system shows exactly what features to look for to tell one species from another". I thought I would test this with a couple of examples from my limited horizons as a European based fern person. During the BPS 2005 excursion to North-Eastern USA, we learnt to distinguish *Cystopteris protrusa* from *C. tenuis* by the former having a shallow creeping rhizome which can be felt just below the substrate surface. So within the detailed description of this species in this field guide it was reassuring to see the sentence "You can feel the protruding rhizome tip by gently exploring the soil just below outermost emergent fronds with your fingertips". Another challenge we faced was to distinguish *Cystopteris bulbifera* from *C. tennesseensis* (the fertile hybrid of *C. protrusa* and *C. bulbifera*) when presented with a roadside bank having both species. In the field

CORRIGENDUM

In *Pteridologist* 4, 4, (2005) the editor inadvertently made the Rev. John Stuart D.D. a Fellow of the Royal Society (F.R.S.). It seems his Fellowship was of the Linnaean Society (elected 21 May, 1793), so the letters after his name should have been F.L.S.

IN THE GARDEN



FERNS IN MY GARDEN - Bracken & Filmy Ferns

Jack Bouckley

209 Woodfield Road, Harrogate HG1 4JE

BATTLING WITH BRACKEN

When I bought my present property, the whole garden was in a wild state and it was some time before I attempted clearing the worst parts. There was a small clump of bracken, I suppose brought in by the builders, and I left that until just about the last. I dug it over and the fern came back the next two or three years, but with continual digging, hoeing and cultivating I eventually 'signed its clearance certificate'.

I earmarked the site for a small wildlife area with a limestone rockery and pond. I dug the hole for the pond, lined it with 500-gauge polythene followed by a proper pond liner. Then I left it to the elements, to fill with water over winter. All went well. Frogs spawned, newts laid their eggs beneath the *Elodea* leaves and then much to my disgust a very handsome frond of the dreaded bracken appeared from underneath the pool liner. All I could do was pull it out, as I would certainly have punctured the pool if I had tried to use a garden tool.

Still it grew, until one day an acquaintance of mine said, "Mix one of the proprietary brands of herbicide with paraffin and paint it with that." I used glyphosate and I have not seen it again. This method has also been tried with success by a pal of mine on *Equisetum arvense*.



PHOTO: JAMES MERRYWEATHER



PHOTO: JAMES MERRYWEATHER

FILMIES FROM SPORE

Some years ago I was given a frond of *Hymenophyllum wilsonii* which had sori attached. I kept it moist until I arrived home when I detached one of the sori.

The remains of a dead tree fern lay in my garden, so I dropped the sorus onto its trunk and left it in the shade of a beech hedge. I inspected it regularly for two years, but nothing in the way of prothalli appeared. However, a filmy fern did eventually appear, but unfortunately it only lasted a few weeks and I can only surmise that slugs or some other garden pest had eaten it. It is possible that it was not the result of my sowing, but came from Martin Rickard with the tree fern. Some supplied by him for a fernery in Yorkshire have got this filmy fern well established on their trunks.

Only a week or so before, I had been told by a young lady who was keen on flower arranging, that a good way of preserving live plant material was by mixing one part glycerine to two parts water and immersing the plant in this mixture. I did that with my other filmy fern frond and is still almost as good now as it was a few years ago. I keep it in a test tube and it has still retained its shape, although it is now slightly darker. It can be taken out of the test tube for inspection and returned without coming to any harm.

ENVIRONMENT

AIR POLLUTION & EVERGREEN FERNS

A Chemist's View

Alistair Urquhart

'Wayside', 82 Banbury Road,
Kidlington, Oxon. OX5 2BX

On family holidays to the English Lake District the beauty of the native ferns that enhance an area where all is beautiful has always impressed me. In more recent years my interest in collecting ferns has led to the purchase of many books on the subject of ferns. Several references to the Lake District ferns can be found in *Our Native Ferns* by E.J. Lowe where I was struck by an observation included in his chapter on *Polypodium vulgare*. Lowe writes about his visit to a small house in Ambleside where he secured the services of the resident, an old man who guided him to the different habitats of the Lake Ferns. Lowe describes the house as "having only two rooms, and being two storeys high, one room downstairs, and another reached by a stone staircase outside the house". He goes on to describe the "Ferns that luxuriate amongst the rock-work and completely cover the house". It is obvious from Lowe's description that the house still exists, now known as Bridge House, an information centre for the National Trust. A few ferns cling to the outside walls but could hardly be said to luxuriate, so why should this be? It could be that in some wanton act of vandalism the ferns were at some time past stripped from the walls, but the position of the house built across a beck would have made this pointless act difficult.

The cause of the disappearance of the Bridge House ferns could, in my view be environmental. I reject climate change as a cause on the grounds that the rainfall in Cumbria could hardly have been higher in Victorian times than it is now. The location of Bridge House I believe points to air pollution as the cause.

Bridge House occupies a position on the main road through Ambleside. All through traffic on route from Kendal to Keswick is funnelled through Ambleside restricted on one side by Lake Windermere and on the other side by the high fells of the Fairfield range. I believe that vehicle exhaust pollution could explain the demise of the evergreen ferns. Acid gases and heavy metal particulates held at 'fern level' by winter climatic temperature inversions have proved fatal.

I can, however, report some good news. I was for many years employed as a chemist working in motor industry laboratories and can report that vehicle exhaust emissions



Bridge House, astride Stock Ghyll in Ambleside.

Inset: *Polypodium vulgare* growing on a wall.

are now much less likely to kill ferns. Recent advances such as the introduction of lead-free petrol and catalysis mean that given a reasonable tolerance to hydrogen sulphide, evergreen ferns may once again flourish in busy roadside locations. My own experience of fern culture also supports this view. I garden near a busy main road where through traffic volumes equate to that at Ambleside, I have no general problems with evergreen ferns.

Lowe lists the species that he observed on Bridge House but does not quantify them. If we take his list as a ranking then the most abundant were *Polypodium vulgare* followed by *Asplenium scolopendrium* and *Polystichum setiferum*, all of which are quite happy in my garden when exposed to current conditions. I made no attempt to cultivate evergreen ferns prior to the introduction of the present emission legislation.

Failures in my garden include *Asplenium ceterach* and some *Blechnum* species but I attribute these to soil conditions or, more likely, amateur incompetence rather than environmental factors.

IDENTIFICATION



Figure 1. Typical appearance of *T. speciosum* gametophytes, in a deep shady crevice on sandstone.

HAVE YOU SEEN THIS PLANT?

Young sporophytes of
Killarney Fern
Trichomanes speciosum

*The J.N.C.C. has requested that for
the protection of this rare plant
the author of this article should be*

Anon.

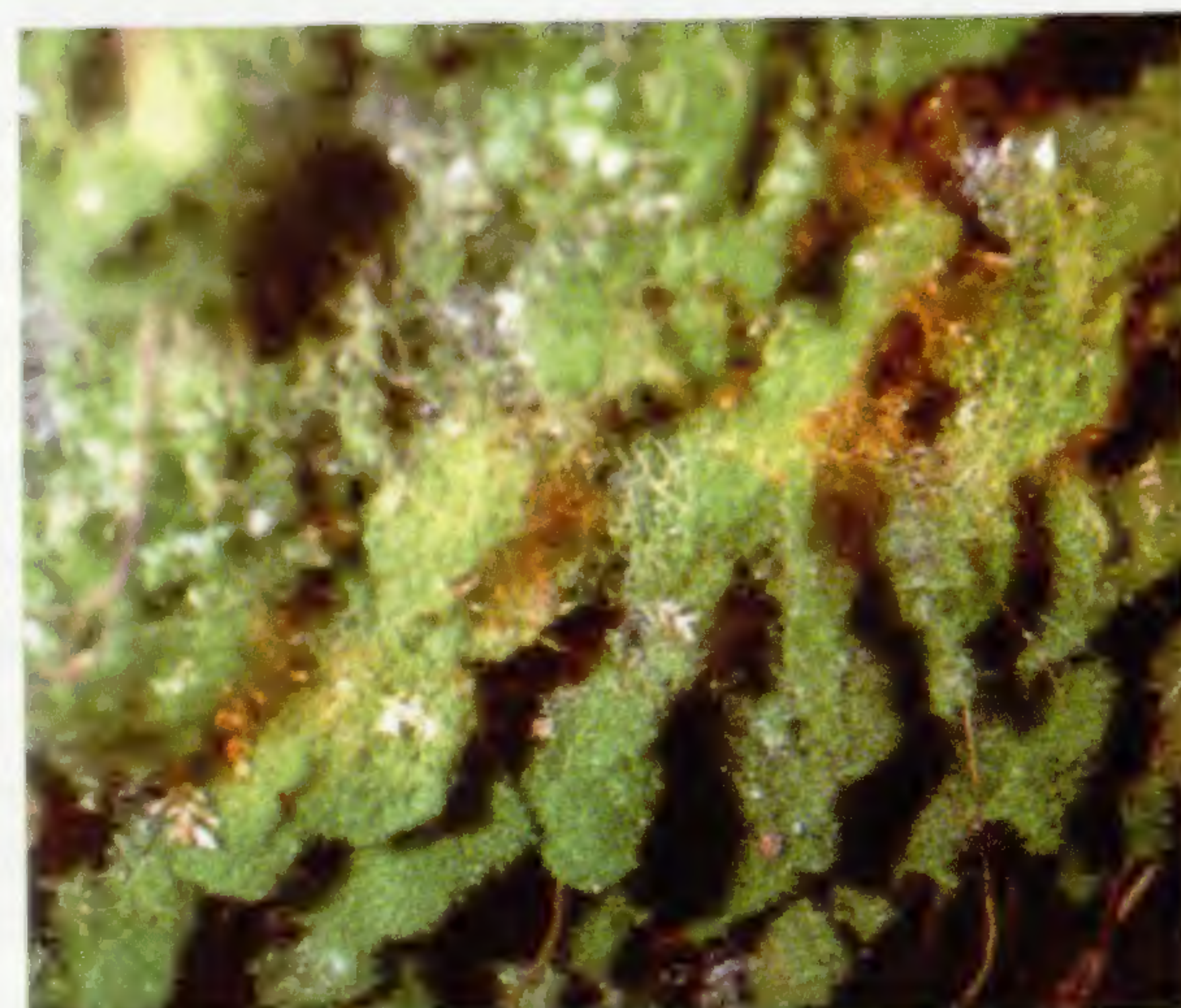


Figure 2. Here, lobes of densely packed filaments, in ridges like ripples in sand. In a more exposed situation, gametophytes may occur as a continuous flat sheet.

Many Society members who live in hilly parts of the country will now be familiar with the gametophyte stage of the Killarney fern, *Trichomanes speciosum* (Figs. 1, 2.), but few will have seen the sporophytes (Figs. 3-16). Since the juvenile stages of the sporophyte look very different from the mature plant, it is possible that they are being overlooked in areas in which gametophytes occur. To help readers recognise juvenile plants, the following pictures illustrate the stages in development of sporophytes, from when they first become visible (but only just so) to the mature plant. Good hunting, but please don't ask where these pictures were taken!

The sporophytes first appear as a tongue-like structure, about 1 mm long and 0.5-1 mm wide (Fig. 3. left). The first frond may then grow to a length of 3-5 mm.

Subsequent fronds are strap-shaped, and may be 5-15 mm long and 0.5-1.5 mm wide (Figs. 4, 5). The rate of production of new fronds varies enormously according to conditions. Several new fronds may be produced in one year, or there could be an interval of three or four years between successive fronds.

Usually, after three or four strap-shaped fronds have been produced and the frond length is in excess of 1 cm, the next frond is forked, resembling a



Figure 3. Young sporophyte fronds of *T. speciosum* (left: first frond c. 1 mm; right: second frond c. 4 mm).



Figures 4 & 5.

snake's tongue (Fig. 6.). However, when sporophytes are growing under unfavourable conditions this may never happen, the plant continuing to produce small strap-shaped fronds indefinitely.

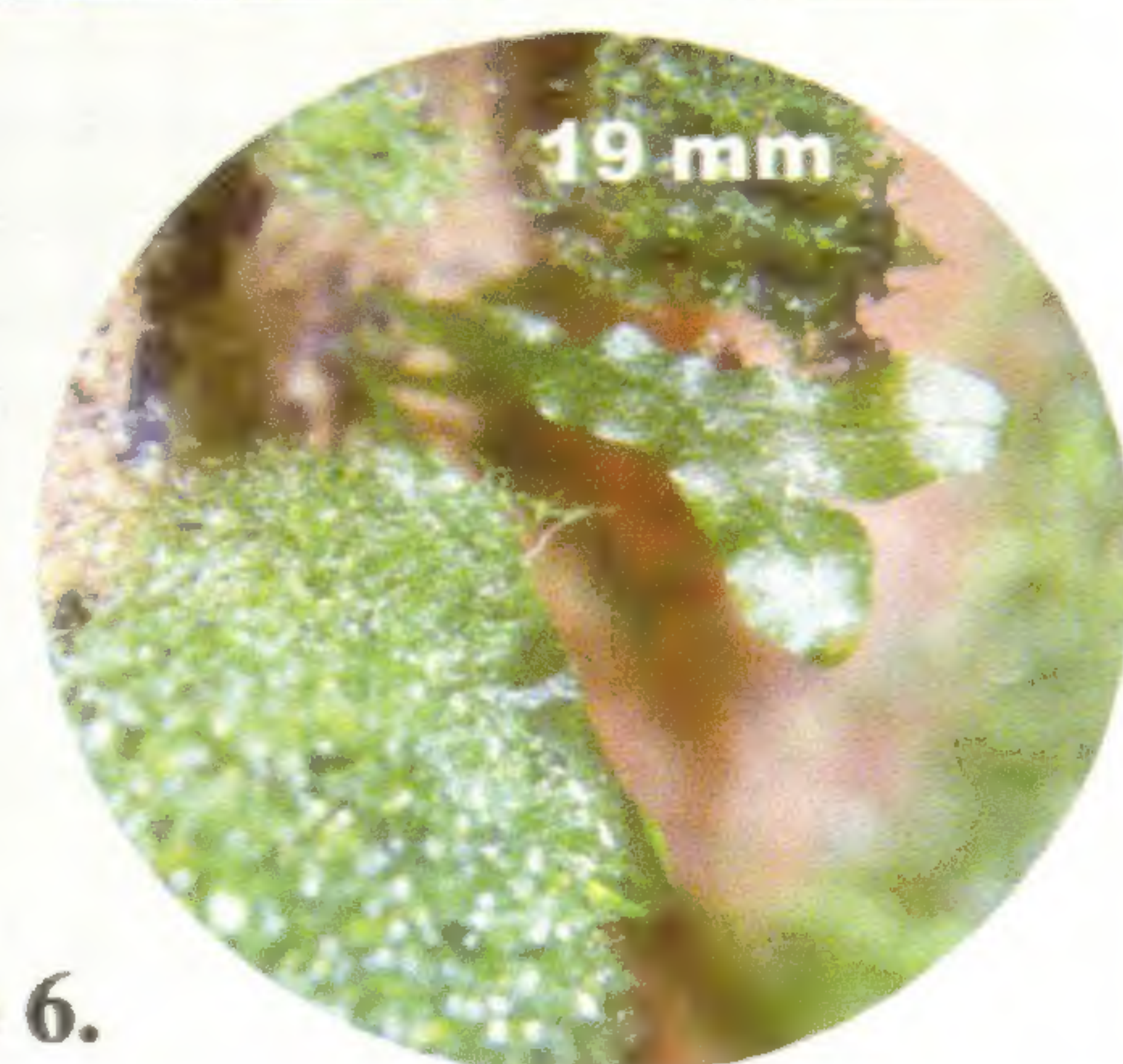


Figure 6.

IDENTIFICATION



Figure 7.

The next stage is the formation of fronds which are forked dichotomously (Figs. 7, 8). This may happen after the production of a single 'snake's tongue' frond, or after several such fronds have been produced.

In the illustrations, frond length is provided as an indication of scale.
N.B. Frond size is not necessarily related to developmental progress.



Figure 8.

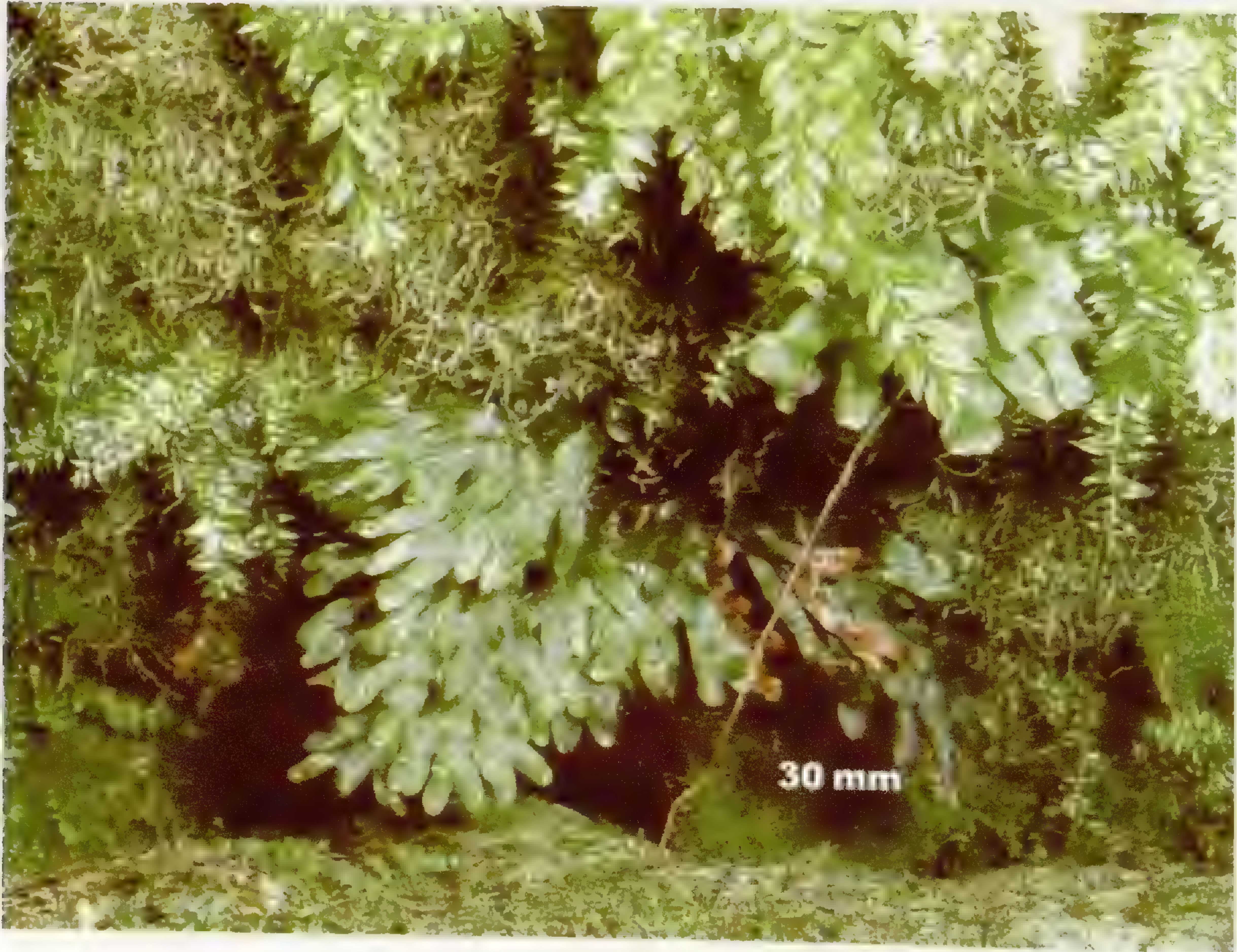


Figure 9.

In some cases, when the plant is growing in a relatively well lit situation, fronds may fork dichotomously several times in quick succession to produce a fan-shaped structure (Fig. 9.). More commonly, as the frond length increases, there is a gradual metamorphosis from dichotomous to pinnate (Fig. 10.)



Figure 10.

As the fronds increase in size, the degree of dissection increases until the plant becomes clearly recognisable as the Killarney fern, as shown in figures 11 to 16.

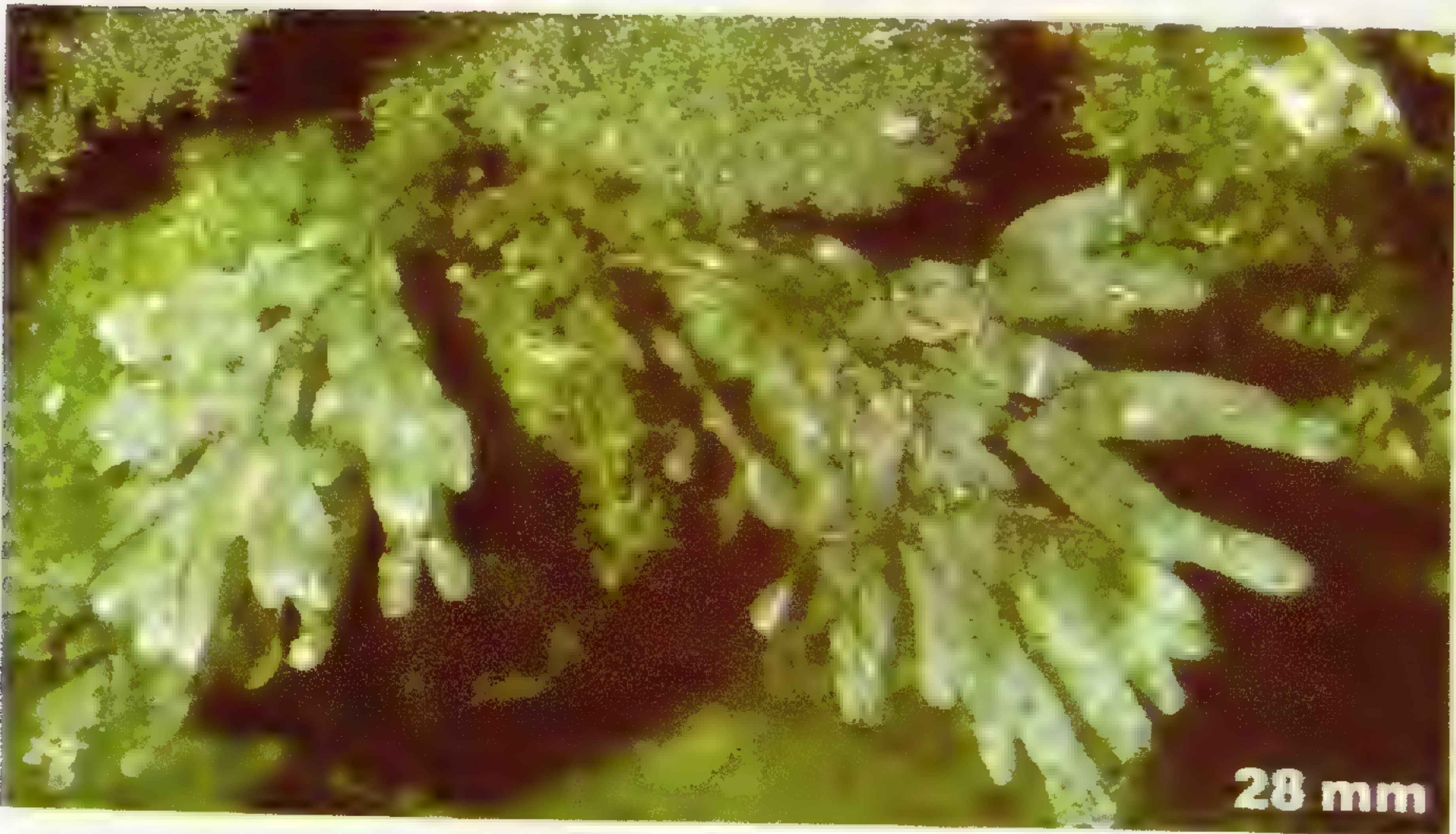


Figure 11.



Figure 12.

IDENTIFICATION



Figure 13.



Figure 14.



Figure 15.



Figure 16.

Tree-Fern Newsletter No. 12

Edited by Alastair C. Wardlaw

Convener of BPS Tree-Fern Special Interest Group

92 Drymen Rd, Bearsden, Glasgow G61 2SY, UK. E-mail: a.wardlaw@tiscali.co.uk



Is It 'Curtains' for Trunks?

As noted in last year's Newsletter, alarm bells rang when alien pests, alive after shipment, were found by phytosanitary inspectors on numerous tree-fern trunks imported into UK from Australia and New Zealand. As a result, the Plant Quarantine branch (now the International Plant Quarantine branch) of DEFRA told UK tree-fern nurseries that tree ferns imported from these countries must, in future, be *nursery-grown*. The authorities in Australia and New Zealand were likewise informed.

The requirement for nursery-grown would seem to render illegal what had been going on for years, namely the importation into UK of good-sized trunks of several species of wild-harvested tree ferns. These trunks, in many cases, had been rescued as a by-product of forestry, or land-clearance operations and might otherwise have been trashed or used as local building materials (see Tree-Fern Newsletters 2004 & 2005).

DEFRA, in subsequent letters, stated that the nursery-grown requirement was definitely going to be enforced, but with a delay until the end of 2006. Also 'nursery-grown' was clarified. The new regulations will still allow the wild-harvest/rescue of trunked tree ferns. Now, however, the plants before being exported, must spend at least 12 months being *grown on* in an approved and inspected plant raising establishment.

How this will translate into UK retail prices is unclear, but what were already expensive plants (the larger ones, at any rate) can scarcely become cheaper. So the prospect is not necessarily '*curtains*' for trunks, but UK tree-fern devotees will almost certainly need deeper pockets if they want to buy trunked tree ferns that have been sourced from 'down under'.

Tree-Fern Survey 2003

Members of the Tree-Fern Special Interest Group may recall the 2003 Survey of members' experiences of growing tree ferns in the UK. The results were presented as a Preliminary Report at the *Tree-Fern Mini-Symposium* held in the Herbarium at Kew in November of that year. The experiences of 19 Group members were summarised in terms of the species, the growth conditions and the successes and failures. The term *tree fern* was interpreted morphologically, and the 41 species surveyed comprised species of *Blechnum* (6), *Cibotium* (2), *Culcita* (1), *Cyathea* (22), *Dicksonia* (7), *Lophosoria* (1), *Sadleria* (1), and *Thyrsopteris* (1). For those who were not able to get to the Kew meeting, I would be happy to mail a copy of this 4-page Preliminary Report to anyone who sends me a self-addressed A4 envelope with a 21p. stamp (UK). Or I could send it electronically anywhere as a 400KB email attachment and free of charge.

Larger Team at Rickard's Hardy Ferns Ltd

Dick Hayward has been joined at Rickard's Hardy Ferns by Ben Kettle and Jennie Jones who now live at the nursery itself. Ben is an ecologist and plantsman, while Jennie is an environmental scientist with a keen interest in ferns. The nursery offers the widest selection of ferns (including tree ferns) in the UK, to gardeners and serious collectors alike. The services include mail order, consultancy and landscape/habitat creation.

Contacts: Tel/Fax: 01248 600385 (days)
Tel: 01286 677641 (evenings).
e-mail: info@rickardshardyferns.co.uk
website: www.rickardshardyferns.co.uk



Rickard's Hardy Ferns, 2006: Jennie Jones, Ben Kettle & Dick Hayward.

A Useful New Zealand Species



Cluster of *Dicksonia squarrosa* in Tresco Abbey Gardens in the Isles of Scilly (May 2005). The stoloniferous habit allows new trunks to develop, even if the primary trunk has died. Note in the gap, the two sawn-off trunks, presumably of dead predecessors and the likely source of the tree ferns shown.

In my garden in Glasgow, trunked specimens of *D. squarrosa* failed to survive their first winters, due to inadequate wrapping. However, new plants sprouted from the ground adjacent to the dead stems and have survived several winters, without wrapping and with minimal frond-browning.

Views expressed in this Newsletter are not necessarily those of the British Pteridological Society. Please send pictures, notes, or articles on tree ferns for the next Newsletter. A.C.W.

Tree Ferns in a Small Garden

Mark Longley

9 Sunset Road, Totton, Southampton, Hampshire SO40 3LA

E-mail: longley74@yahoo.co.uk



My tree-fern collection started in early 2001 with a single 30 cm trunked specimen of *Dicksonia antarctica*. I planted it in a pot and quickly developed an obsession for tree ferns, with my collection soon expanding to the full array of species available from Australian and New Zealand exporters.

Having recently bought a house with a small garden, I decided in autumn 2004 to plant a small tree-fernery, despite certain limitations of the site. In particular, it is south-facing and lacks overhead protection.

The garden is located about 0.5 km inland from the south coast of England, and just outside the city of Southampton. It enjoys a temperate maritime climate (Zone 9A). Summer highs reach 25-28 °C, while winter lows rarely fall below -4 °C and even then not for long. However, good rainfall has lately been in short supply.

The space available for the tree fernery is only about 3 x 6 m. It is protected on one side and the rear by 2 m high fence panels that mark the border of the garden.

The main design problem was how to add further shelter from wind and sun, leaving only the forward facing (north) aspect exposed. For the rear shelter I opted for *Phyllostachys aurea*, a golden-caned bamboo with vivid green foliage that nicely complements the tree ferns. I expect it to provide not only wind resistance but also, as it grows taller and denser, shade during the summer months.

Overhead shade is currently provided by two *D. antarctica*, one of which is an unusual four-headed specimen. This species seems remarkably able to accept the full English sun, and the two plants give enough shade to cover most of the fernery floor. With some wind shelter and overhead shading taken care of, I then planted a sapling *Robinia*, which hopefully as the years go by will offer additional protection. This species, although deciduous, has delicate clusters of leaves and an open branch system, suitable for a small garden.



The tree fernery from the north-west. L to R: *Dicksonia antarctica*, small *Cyathea tomentosissima* (at base), multi-trunked *D. antarctica* (centre), *Cyathea dealbata* and *Phyllostachys aurea*.



Centre: recently-planted *Cyathea australis*; and Right, *Musa basjoo*.

The collection, additional to the two main *D. antarctica*, contains 30-60 cm trunked specimens of *Cyathea australis*, *C. cunninghamii*, *C. dealbata*, *C. smithii*, and *Dicksonia fibrosa*. I have also inserted young, non-trunked specimens of *D. sellowiana*, *C. tomentosissima* and *Todea barbara*. Hopefully all of these will be reliable under my local climatic conditions.

Ground ferns that I have fitted in include *Dryopteris sieboldii*, *Blechnum spicant*, *B. fluviatile*, *B. magellanicum*, *B. tabulare*, *Woodwardia radicans*, and the recently available *Lophosoria quadripinnata*. These are all evergreen and should provide year-round interest as the main trunks grow taller and expose the understorey.

Chipped bark on the ground enhances the natural appearance of the fernery, as do some branches and stumps placed in the gaps between plants. These not only give a 'forest floor effect' but also help to maintain high humidity at ground level. Extra coverage is provided by dead fronds, which are scattered on the floor and left to decompose.

Specific requirements had to be considered. For example, *C. smithii* which needs better shelter from sun and wind than *D. antarctica* was planted at the back of the border. There it gets almost no wind and only the early morning sun. Likewise *C. cunninghamii*, also a gully-inhabiting species, was planted towards the rear directly under the canopy of the larger *D. antarctica*. I have found that this latter *Cyathea* is rather more tolerant of sun and wind than documented, provided it is kept very moist. *C. tomentosissima* and *D. sellowiana* are positioned near the front of the border in the

belief that they can withstand rather more sun and a stronger breeze. With all the imported trunks, frond size was reduced for the first one or two seasons until the tree ferns had re-established themselves.

Winter protection: The two *D. antarctica* have survived the winters so far, with just some crown protection to protect the new crosiers from frost. Their canopy, in turn, has protected all the smaller ferns from frost. Crucially in my view, survival after overnight frost is also dependent upon rapid warming by the morning sun. Therefore the fernery was positioned to receive full winter morning sun, and individual specimens were placed strategically to maximise this exposure.

Watering: I have not installed any misting or watering system since it is not really needed. Such a small area requires maybe five minutes of watering per day during the summer months and could probably go for a week or two completely un-watered, without being stressed. The fernery floor also helps in this regard through being very moisture-retentive, with its ground bark and frond litter.

Finally, establishing this fernery has been immensely enjoyable, the only costs being those of time and plants, rather than materials and construction. It is rewarding now to stand back and watch it grow and develop.

Three Years (Plus) of Convalescence!



Cyathea dealbata, showing changes in stipe diameter after harvest and shipment, and during three years of recovery in my garden.

I have had trunked specimens of *Cyathea dealbata* that put out long (~150 cm) fronds on thick stipes during their first year in the garden. But these were relatively short-trunked (~50 cm) specimens with a good-sized root ball. I had a different experience with the 2 m trunked specimen whose crown is shown opposite, and which had hardly any root ball – around the absolute minimum for bare survival. This specimen took three years to recover, even partially, from the traumas of harvest, shipment and replanting.

During its first year, it put out five miserably short (~50 cm) fronds on the very spindly stipes (labelled 1, opposite). Next year the stipes (2) and fronds were bigger. In the third year, the stipes (3) approached the pre-harvest diameter (4), and the fronds for the first time had a few sori.

I was less than completely diligent with the recommended daily trunk-watering, which may explain the miserable growth initially. However, I was not more attentive subsequently. In year two, I installed a trunk-watering pipe with an 'octadripper' spray head (5) at the top. This allowed trunk watering as required, but was not done as often as daily. The octadripper was positioned to irrigate from the top of the trunk downwards but not into the apical cleft.

I also tried clingfilm for keeping the trunks of tree ferns in an atmosphere of constant 100% humidity. I could tell the atmosphere was saturated by the beads of condensation visible on the inner surface of the clingfilm. Watering was done by hand, about once weekly, at the top edge of the clingfilm, just below the crown. Fungal growth was not a problem during several summer months of such covering, but the clingfilmed trunks were a bit unsightly.

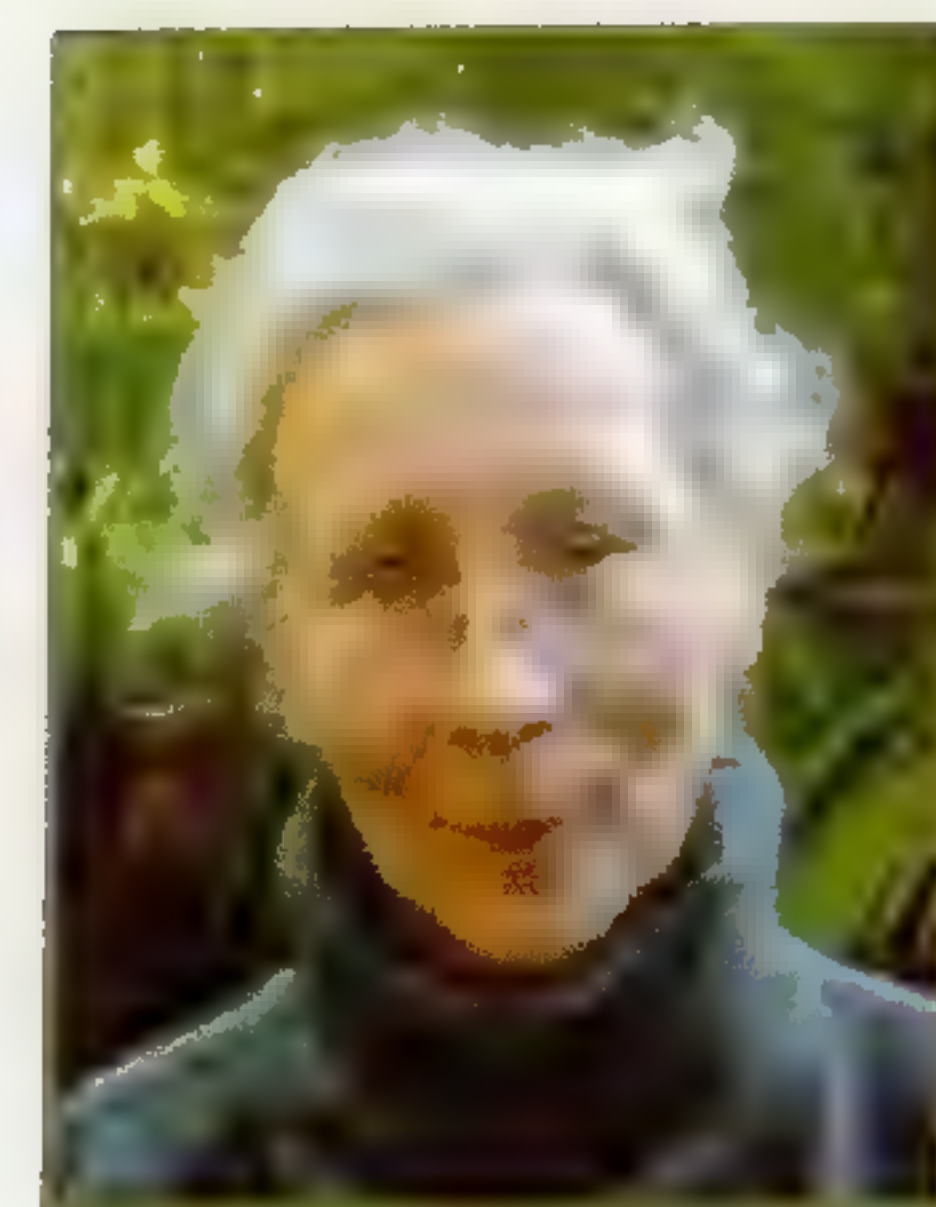
Alastair C. Wardlaw

Tree Ferns in a Cornish Woodland

Sheila Tiffin

28 Union Street, Camborne, Cornwall TR14 8HG

E-mail: sheila.tiffin@btinternet.com



My first tree fern, a *Dicksonia antarctica*, was acquired in August 2000. Subsequently I was at my favourite Cornish nursery, Trevena Cross near Helston, with a very good friend who offered to buy me "a small fern". I looked skywards and joked "I'll have that one" - which is how I acquired my first *Dicksonia squarrosa*. Its addition seemed to create a definitely mysterious atmosphere. It overwintered well, without protection, and looked fresh and leafy the following year. This encouraged me to plant two more in our 2.25 acre woodland of mixed coniferous and broad-leaved trees.

Watering: During the spring and summer I spray my tree-fern trunks with water every day and they seem quite happy. I am told that *D. squarrosa*, if exposed to -5 or -6 °C, will defoliate but recover. Unfortunately, I have only recently started to keep temperature records, but in the five years of making this garden in the wood, the bird baths have frozen only twice. John Eddy of Trevena Cross recorded -5 °C in the winter of 2004/05, but my site should be milder because of all the overhead tree cover

Cyathea medullaris in the 'fern pit' has been growing there, unprotected, since Spring 2001. It has fronds 3.3 m long and up to 1.4 m broad, with a spread of 4.2 m.



Cyathea medullaris, with 1 m trunk, growing in a 'fern pit'

Despite usually still growing in previous Decembers and being continuously well watered, this *C. medullaris* hardly moved during the hot and dry July and August of 2005. Occasionally it has sustained some slight predator damage (of uncertain source). I estimate that it has at least doubled in size since being planted. Perhaps the secret is in the mulching with well-rotted (3 years old) horse manure and the occasional weak liquid seaweed feed. It is in a fairly sheltered, sunny spot, although now it has grown so big, its

fronds do tend to catch the wind and get damaged. Because of the possibility of a mine shaft beneath the fern pit, in 2005 I planted a second specimen (below) in case the first disappears! Or, to be more accurate, my partner Mark did the backbreaking job of planting it for me. This second plant has a trunk height of 2.6 m and more numerous fronds, but they are not yet as long as those of the pit specimen.



Left: 2.6 m trunk of my second *Cyathea medullaris*. Centre: *Cyathea cunninghamii*. Right foreground: *Blechnum magellanicum*; Left foreground: *Pneumatopteris pennigera* and *Osmunda regalis*.

Cyathea cunninghamii went into the gully in 2004 and grew quite happily from November through to January, which was very mild. Unfortunately, a sudden two-week long cold snap, combined with bitter north wind, caused it to defoliate. I therefore breathed a sigh of relief in April 2005, when it began growing again. I have since moved it to a more sheltered spot. Last winter an *Entelea arborescens* (tender New Zealand shrub), which had been outside for four years, perished along with a small trunkless *C. medullaris*. In contrast, young trunkless plants of *Cyathea dregei* and *C. tomentosissima* survived unprotected, albeit with some frond damage.

Other trunked ferns: A gorgeous plant from Chile is *Blechnum magellanicum* which came through last winter totally unscathed. I believe it can develop a trunk to 1.5 m, so mine with a trunk 15 cm high and 18 cm diameter, and fronds of 70 cm, has some way to go.

Also growing in the woodland are *Blechnum discolor*, *B. gibbum*, *B. nudum* and *B. tabulare* all of which produce small trunks. Two other exotics I should mention are *Lophosoria quadripinnata* and *Todea barbara*.

On trial: The following (untrunked) tree ferns were planted in 2005 and, at time of writing, have still to be overwintered successfully: *Cyathea brownii*, *C. cooperi*, *C. dealbata*, *C. robusta*, *Dicksonia berteroana*, and *D. sellowiana*.

To trim or not? Several of the tree ferns are developing skirts. My initial reaction was to clip off the dead fronds but I rather like the look of them, and feel they probably benefit the plant. They are therefore left skirted.

Trebah: In my quest for information on unusual species of tree fern I visited Trebah Garden on the Helston River,

which has a magnificent collection of *Dicksonia antarctica*, including one of the largest specimens in the country.

It also has *C. cooperi*, *C. medullaris*, *D. fibrosa* and *D. squarrosa*. The last had died back some years previously and then sent up new growth from the base, a well known feature of this species.

Winter precautions: I was amazed to find that I had more varieties of fern than Trebah, which made me wonder if I am being over-optimistic about long-term survival of some of the tree ferns? I have therefore stocked up on fleece and straw and started to use them. It's very exciting to try the more unusual varieties of tree fern, and I shall continue to do so.

Meanwhile I am building up a large stock of the hardier species, such as *D. antarctica*, *D. fibrosa* and *Cyathea australis*. Although the climate is usually very mild in Cornwall, we do occasionally get severe winters. Indeed, at the time of writing, there were predictions that the winter of 2005/06 may be the worst for 40-50 years.

We shall see!

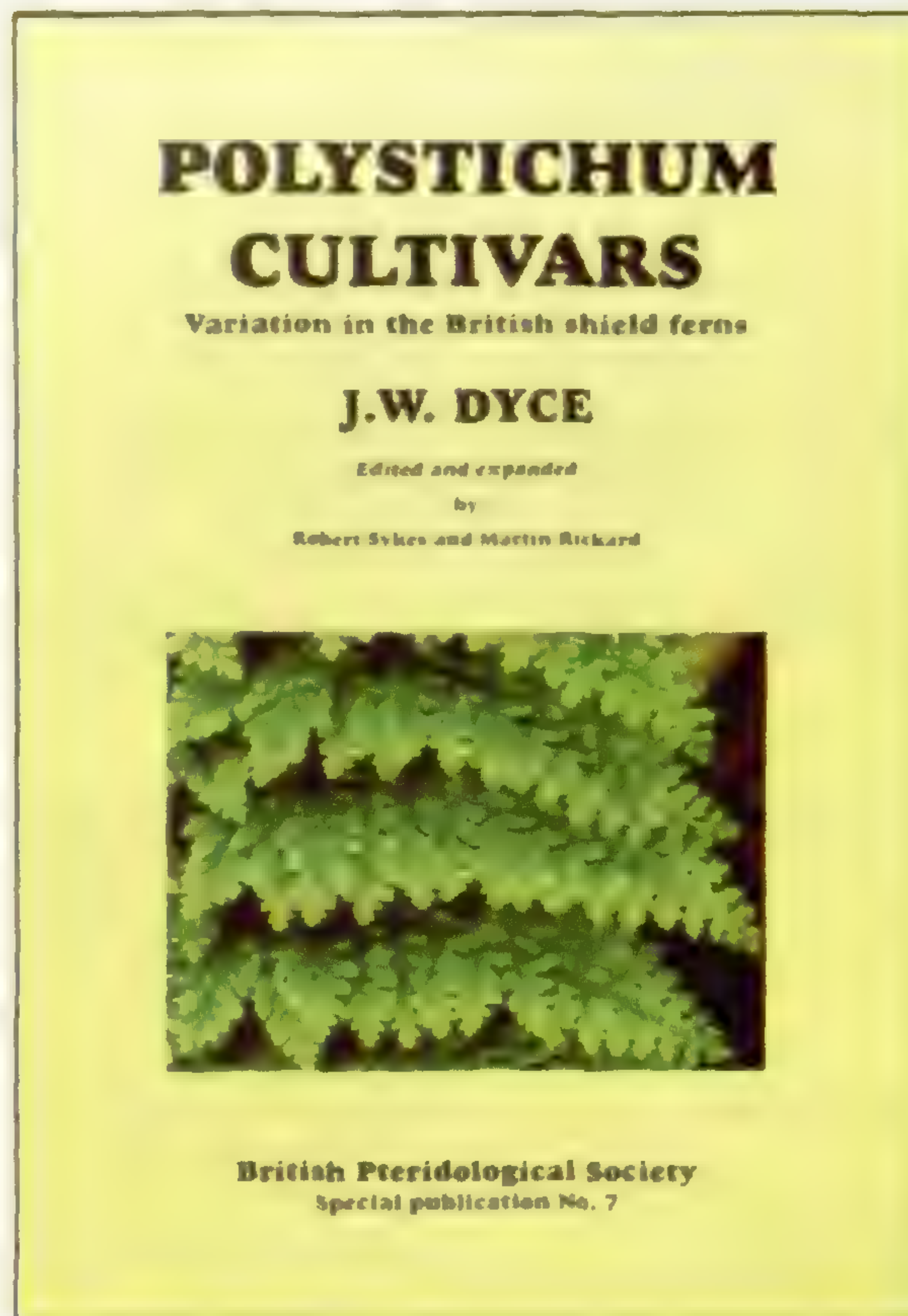


Three large specimens of *Dicksonia squarrosa*

BOOK REVIEW

In Victorian times British fern men would avidly seek, retrieve, cultivate, propagate and name very many different forms of the Soft Shield Fern, *Polystichum setiferum* (it was called *P. angulare* then). Efforts to bring order to this frenzied activity included the circumscription and description of cultivar groups, exemplified by E.J. Lowe in his "British Ferns and Where Found" (1890 & 1908). In this work, Lowe recognised 366 Varieties (now correctly called Cultivars – see below) of *P. setiferum*, classified within 26 Sections within 11 Groups within 4 Divisions. This classification was in turn based on earlier work by Dr. F.W. Stansfield.

In the latter half of the 20th century, although the earlier frenzy had largely subsided, there were still many varieties around and the old names had not gone away. It was in this climate that Jimmy Dyce (JWD) commenced his quest to bring order to chaos by writing, probably over many years, the draft of this book. The book was unpublished and unfinished at the time of his death in 1996, but knowing the importance of this work, Robert Sykes and Martin Rickard undertook the significant task of reviewing, editing and expanding JWD's work. The result is this fine book, published in November 2005 (to coincide with the



Robert Sykes & Martin Rickard (eds)
BPS Special Publication No. 7, 2005
ISBN 0-9509806-6-8 (£12)

Reviewed by
Graham Ackers

BPS *Polystichum* Mini-symposium at Kew Gardens on 19th November).

Preceded by an eloquent Foreword by Alastair Wardlaw, the contents include separate introductions by the editors and JWD, a history, and sections on the three British polystichums: *aculeatum*, *lonchitis*, and *setiferum*. The treatment of *P. setiferum* constitutes 75% of the whole book. Concluding the work is a glossary, a note on the national collections, acknowledgements, and an index. Throughout, the text is punctuated with boxed comments from the editors. There are 118 black and white illustrations of fronds and parts of fronds, some original, and many taken from books by Lowe, Moore, and Druery, plus the Moore Herbarium at Kew and the Jones Nature Prints. Both the frontispiece and front cover plates are coloured. The book has 100 pages, is a paperback, the production quality is very high indeed, and the work is a pleasure to hold.

Does the book work in helping to name *Polystichum* Cultivars? Well, I have been using a draft of this book for the past 6 months (as at November 2005). Let me explain. Over many years, the Society has built up an archive which included several hundred pressed fern fronds. However, our archive storage arrangements were less than satisfactory and so it was decided to offer the BPS Herbarium to the Royal Horticultural Society (RHS) for incorporation into their own herbarium at Wisley. The RHS was delighted with this suggestion, but requested help in re-mounting, naming and databasing the specimens. In view of my relative proximity to Wisley, I agreed to take on this work, and since May 2005 have been contributing one day a week to this task, assisted by Jennifer Ide. A significant number of the *Polystichum setiferum* specimens in the BPS Herbarium (173 fronds) were assembled by the Rev. Charles P. Padley and Mr. Thomas Smith between 1860 and 1870. These fronds are in very good condition, and display a wide range of variation, many forms not being seen in cultivation today. Unfortunately, the Rev. Padley's handwriting is frequently illegible, but in order to register a specimen on the RHS database, it is necessary at least to have a Cultivar Group name. This



BOOK REVIEW

naming construct, which is defined in the "International Code of Nomenclature for Cultivated Plants" (ICNCP) allows a Cultivar to be assigned to a rank above the Cultivar name, and is explained fully in this book. The book recognises and defines 32 Groups for *P. setiferum*, and with the vast majority of BPS herbarium fronds, it is possible to assign a Group name. Thus, sometimes the specimen is registered on the RHS database with a Group name only, frequently with a Group name and a Cultivar name, and occasionally with a Cultivar name only. All three combinations are valid within the terms of the ICNCP. In my experience therefore, the book works admirably at the Group level, and assigning a specimen to its correct Group will I am sure satisfy most users. However, identifying a specimen to Cultivar name level may prove more problematical. The book mentions 107 Cultivar names, most of which are described. But it is the nature of variation that intermediates can and do occur, and remember Lowe's recognition of 366 varieties! Having said that, all of the more commonly available Cultivars are described, and it should prove reasonably straightforward to name them providing one correctly identifies the Group first.

A little more about nomenclature might be in order. Much of the variation in *P. setiferum* occurs in occasional and solitary wild finds (which subsequently may be propagated to produce more variation). Historically, and perhaps sensibly at the time, such forms were called "Varieties". However, this term is explicitly defined in the

International Code of Botanical Nomenclature (ICBN), and wild variations in polystichums do not fit this definition. Therefore, plants displaying such variations must be called "Cultivars", the definition of which within the ICNCP fits both wild and cultivated *Polystichum* variation. This and other nomenclatural issues are discussed more fully in the editorial boxed comments on page 10 of the book. As noted above, the ICNCP allows for and defines the concept of the Group, but no other categories above the level of the Cultivar. However, to aid clarity JWD and the editors have "grouped the Groups" into two higher categories, but sensibly avoided giving formal names to these two hierarchical levels (although JWD in his original manuscript did provide botanical names to the intermediate higher category).

Whilst JWD clearly loved finding, researching and growing his *P. setiferum* cultivars, there is always an element of realism in his descriptions. For example, he describes most forms within the Depauperatum Group as being "fit only for the compost heap". I would not argue with that! The editors have an equal love of their subject, and have devoted many hours over many years to bring this publication to fruition. All concerned are to be congratulated on a superb book, one of the most important fern books to be published in recent times. So, whether your interests are with fern cultivars, rare fern images, fern history, or just ferns in general, do buy this fine book. You will not be disappointed! *Order from BPS Back Numbers.*

Announcing a new website devoted to Ferns in Britain and Ireland

www.ferns.rogergolding.co.uk

This is an ongoing project intended to assist with the identification of British and Irish ferns in the wild, as a supplement to field guides. I have been working on this slowly over the past two years, and have now decided the time has come to go public despite its incomplete state. As it stands, it lacks substantial sections of text and many images. This first phase covers full species, some of the more well-recognised subspecies and varieties, and the most well-established aliens. In future versions I will be extending the coverage to include hybrids. I hope eventually to include a key, and by the time this is published there may be a glossary.

The majority of the photographs are my own, and are of variable quality. I have had help and contributions from some members of the BPS; I need more. If anyone is interested in contributing images, either filling in the gaps or providing better quality images, please contact me at the e-mail address below. The aim is to get comprehensive sets of images of the main identifying characteristics, as well as typical habitat and appearance shots. The current maximum image dimensions are 500 x 500 pixels, but higher resolution versions are better as future versions may include larger images (the site is designed so that images will load reasonably quickly for those not yet on broadband). Although digital images are preferred, I can scan photographs or slides. Don't send large image files by e-mail - contact me first. Suggestions for the future development of the site are also welcome.

e-mail: rg@rogergolding.co.uk





WORLD FERNS

JOURNEY TO THE JUAN FERNÁNDEZ ISLANDS

Billy Alexander

28 Mount Eagle Rise,
Leopardstown Heights,
Dublin 18, Ireland

The Archipiélago Juan Fernández

is situated at latitude 33 °S in the Pacific Ocean, 670 km west of Valparaíso, Chile. It consists of several volcanic islands, the principal being *Isla Robinson Crusoe*, also known as *Isla Más-a-Tierra*, and located closest to continental South America. The uninhabited *Alejandro Selkirk Island (Isla Más-a-Afuera)* is a further 180 km westwards. Also uninhabited is *Isla Santa Clara*, actually no more than an islet, and just 1 km south-west of *Robinson Crusoe Island*. The population of the archipelago is about 600, almost all living in the only town, *San Juan Bautista*, on the main island. Here the visitor finds no banks, no post office, no cars, no keys to the door of the accommodation, no price lists or menus – giant lobster is the usual dish. Also there is no meat, few or no vegetables, and land transport is just a couple of jeeps.

The primary purpose for visiting Juan Fernández was to see the massively-trunked *Blechnum cycadifolium* in its native habitat. The species is endemic to these islands and not available in horticulture. For a long time I have wanted to compare it with some of the other large *Blechnums* of the Southern Hemisphere which I find very attractive, the *B. chilense* and *B. magellanicum* of mainland Chile, and the South African *B. tabulare*.

In late February 2005, my companion Ray Sheehy, a fellow plant lover, and I arrived in Santiago where we spent the night. Next morning, a taxi took us to the grandly-named Tobalaba Airport, actually just a deserted hangar. Other passengers eventually appeared for the 2.5 hour, 800 km, flight to the Islands in a small 14-seat aeroplane. The plane's owner, Don Carlos Griffin, was on board so we were treated to a circuit of Robinson Crusoe Island before landing on the bumpy, dirt airstrip. There was then a walk of about 1.5 km to the jetty, which is situated on a bay formed from a volcanic crater. Fur seals were in residence. At the jetty, all the bags were already there except mine (which eventually was found!)

Instead of an airport bus into town, we had to get into a small boat with an outboard motor. This took us on a 2 hour ocean trip around the coast, fortunately on a calm sea in nice weather. The destination was *San Juan Bautista*, on the shore of the safe anchorage of *Bahia Cumberland*, and our home for the next four days.

Walking up the pier looking for accommodation (nothing booked of course) I saw a wonderful, obviously-planted, tree fern which looked like *Dicksonia externa*. It was at this point I learnt that this species is endemic only to *Alejandro Selkirk Island*, a mere 180 km away. It does not grow naturally anywhere on *Isla Robinson Crusoe*. So much for my research!

After a good night's sleep, despite plenty of mosquitoes keeping us company, the programme started with a trip to *Puerto Frances*. This required a 45 minute journey by boat to a very barren beach.

Soon, however, we saw *Gunnera peltata* lining the banks of a stream and then our first *Blechnum cycadifolium*, albeit only small, young plants. The walk proceeded up a hillside and into woodland which had a lovely climbing fern, identified by our knowledgeable guide (all trips must be taken with an official guide), as *Arthropteris altescandens*. Further on, we came across another *Blechnum* which we were advised was *Blechnum schottii*, and some large *Lophosoria quadripinnata*.



Dicksonia externa on *Isla Robinson Crusoe*, where it does not occur naturally. This cultivated specimen is one of only two on this island.

At the top of the hill there was a sheer drop of 300 metres to the sea below. Unfortunately, due to the thick mist, the view was very poor and the nearby *Isla Santa Clara* not visible. However, there was plenty of vegetation to enjoy on the cliff face. We returned down the wooded mountainside in ever-worsening rain, and got thoroughly soaked.

WORLD FERNS

Our second day provided the highlight of the trip. The objective was the peak *Mirador Selkirk* at 565 metres above sea level and owing its name to Alexander Selkirk of Robinson Crusoe fame. It was here that he allegedly climbed each day to look for passing ships. We took the trail to the top, a hike of about 2 hours. There were numerous ferns, including many *B. cycadifolium*, but only small plants. *B. chilense* was also plentiful along the sides of the path.



Above: Mirador Selkirk, Robinson Crusoe's lookout point, with masses of large-trunked *Blechnum cycadifolium* on the hillside.

Below: close up of *B. cycadifolium*.



As we neared the top, the plants became more dramatic and larger. Whilst the lower slopes were relatively dry, at higher altitudes they became increasingly wetter and the vegetation correspondingly lush. Under such favourable conditions, *L. quadripinnata* became truly massive. Its 2 m fronds arched over us as we sat on a bench in the forest of trees and ferns and enjoyed the spectacular views out over *Bahia Cumberland* and the surrounding steep lush-green covered mountainsides. The endemic palm, *Juania australis*, poked its fronds above the canopy. This summit of *Mirador Selkirk* was one of the best vantage points in any of my travels, anywhere.



Above: *Arthropteris altescandens*

Below: *Blechnum schottii*



However, for pteridologists the best was still to come, when we met the largest and oldest *B. cycadifolium* anywhere on planet Earth, which is stating the obvious as they grow to this size nowhere else! The fat, black trunks were truly massive, and seemed to twist and bend around the mountainsides and up and down gullies. In general appearance they were quite similar to the mature, large-trunked *B. tabulare* that I had seen in South Africa, but smoother and fatter. They were abundant in this particular area, so I climbed a little further to nestle among them and enjoy the moment of communion. It was hard to estimate their age but I guessed that some might easily be more than 100 years old.

Descending to the west of the *Mirador*, the trail went through further lush forest, dripping in moisture and hugely rich in plant life. It had a tropical feel to it, with monster ferns greeting

us at every turn along the winding path down the hillside. It was here that we saw *Thrysopteris elegans* at its most magnificent. True, it just doesn't have a trunk but it scarcely needs one, as the stipes can reach up to 2 m with a huge frond at the top, not unlike a *Gunnera* leaf.



Enormous J-shaped trunk of *Blechnum cycadifolium*, flowing down the hillside and then turning upwards.

Another treasured moment was the first sight of *Dicksonia berteriana* in the wild. Having my own small specimen that had been carefully nurtured for 5 years, I could look 50 years into the future. On the slopes above and below the pathway there were other large specimens, with big thick trunks more than 2 m high and similar to the New Zealand *D. fibrosa*. Contrast was provided by the bamboo, *Chusquea fernandesiana*, which is endemic to these islands, and which grows prolifically where lighting conditions allow.

Our third and last day of exploration had the intended destination of *El Yunque*, the highest point on the island, at 915 metres above sea level

and home to the *Yunquea tenzil* a tropical large-leaved plant and another endemic. We walked for about 3 km in very pleasant countryside but with few ferns to attract attention.

When we reached the plateau area, hundreds of absolutely massive *Gunnera* greeted us. There was literally a forest of them, with huge trunks, some so heavy that they snaked along the ground and then up towards the light. Their enormous leaves provided a canopy for sheltered strolling.

Beyond the *Gunneras* was a walkway through very pleasant forest with many ferns, but neither *T. elegans* nor *D. berteriana*. Instead there were *Blechnums*, including some small *B. cycadifolium*, or possibly *Blechnum schottii*. There was nothing large or trunked.

It would appear that the *B. cycadifolium* does best in open, exposed areas. Unfortunately we did not find the way to the very top of the mountain so we headed back down the path into the town. On the way, we came across the only other *D. externa* in cultivation on the island. It had about a 1.3 m trunk and a lovely crown of fronds. The frond tips arched backwards and the texture was quite rubbery to the touch.

There was an early start next day for the two hours on the ocean in the open boat (with outboard engine), to get back to the airstrip. I didn't feel well at the start and got progressively worse as seasickness took hold in the rough seas. The waves broke over the bows to dampen my spirits further. Luckily I had missed breakfast, otherwise stale bread and terrible coffee would have been lost overboard! After what seemed an eternity, we made it back to *Bahia del Padre* at the top of the island, soaking wet but delighted to be on solid land again. In my fragile state, I hopped into the old Land Rover with the rest of the bags, to get a lift to the airstrip.

The plane was full, due to the summer season coming to a close. Once airborne, we got one last look over the island before turning east for Santiago. Altogether, we had had a very memorable trip and strongly recommend it to all pteridologists.

Checklist of ferns, seen and identified by me or others, during our visit to *Isla Robinson Crusoe*

Adiantum chilense
Asplenium obtusatum
Asplenium stellatum
Arthropteris altescandens
Blechnum chilense
Blechnum cycadifolium
Blechnum hastatum

Blechnum schottii
Dicksonia berteriana
Dicksonia externa
Histiopteris incisa
Hymenophyllum plicatum
Lophosoria quadripinnata

Megalastrum inaequalifolium
Pleopeltis macrocarpa
Polypodium intermedium
Pteris chilense
Rumohra berteriana
Serpyllopsis caespitosa
Thrysopteris elegans



HOW TO RECORD FERNS

Chris Page

Gillywood Cottage,
Treboost Lane,
St. Stythians, Truro,
Cornwall TR3 7DW

SEEKING THE REGULAR AND THE UNUSUAL

In my previous article (Page, 2005) I tried to answer the question of *why* record ferns. Here I will try to address the 'how' of the same process, which is necessarily a more personal approach. For recording ferns is not just about filling blank squares on a map - it is fundamentally about using your own intellect to observe what you find. I have tried to group my thoughts here under a few sensible headings. In most of my own studies worldwide, I have concentrated my focus on two ancient vascular plant groups which I have studied simultaneously - pteridophytes and conifers. Much the same approach and experience base applies to each, and has application not just to their distribution and taxonomy, but also to their ecology, evolution and conservation.

AWARENESS

Maintain constancy of awareness. An analytical awareness of location of what is constantly around you needs to become an inbuilt sense. I think this is something I learned very early on, especially from my tutor and friend the late Dr Trevor Walker. Be aware of natural variability, both innate and induced, and assemble your views of species around this, with a constant awareness of the significance of incorporating new data (for we seldom, if ever, know everything about anything). Be aware that all observations (whether yours or those of others) are, to a large extent, comparative. Field encounters with new finds need comparison with all other images in your memory, and of all other data available, and this is clearly where experience most comes into play. Some people can, for example, either instantly recall or look in past notebooks, and picture exactly what was the appearance of a previous encounter with that same species, and even its detailed habitat. I consider myself fortunate to be amongst those who have no difficulty in doing this (although it can be frightening to realise that some of these are images that have been mentally stored for more than half a century - a little longer than the history of modern computers). Develop your sense of awareness and keep it 'running' at all times. For it is

often where and when you least expect, that you can stumble upon the most unusual, and thus need such recall.

Develop an awareness for a plant out-of-setting. It is important that we record ferns in their natural settings, and thereby begin to build a concept of their habitat as well as a map of their range. Such an experience base itself also gradually builds, to the extent that it becomes strongly indicative of what is in 'in-place' and what may be 'out-of-place'. Be open-minded. For an individual plant which is out of its typical setting should arouse our curiosity sufficiently to investigate further. We may wish to question its taxonomic status or investigate reasons behind unusualness of occurrence, and if these relate to factors of unusual microclimate, or unusual geology or local site history at the location we have found. I have proposed (Page, 2006) that in this respect ferns can form valuable future indicators of climate change, and to this end our past and present fern recording provides important foundations on which to build.

Keep an awareness of habitat dynamics. On a coarse scale, the habitat of a fern is something which we can record on a label, such as 'woodland slope beside stream' or 'edge of roadside ditch'. But be prepared to note also finer details of the niche. Be aware that plants are where they are not just at the moment we see them: few habitats are static, and most are constantly changing with time. Many are seral, in a state of progression. Most seres follow a disturbance event and are part of wider environmental processes, which may be natural or artificial, such as a ditch being dug. In such sites, recent excavation or clearing may have opened new habitats of bare mud slopes, and new colonists may be appearing. Be aware of such dynamics in vegetation, and see if the occurrence of your plant relates not just to the type of habitat but also to the dynamics of the site.

Be aware of indicator species. Indicator species can provide valuable pointers in the field towards finding habitats for other genera characteristically associated with them. For example, I have found scattered sites for the rare *Equisetum pratense* in the Scottish Hebrides by first spotting primroses *Primula vulgaris* at great distance through field glasses, and investigating these. I have similarly 'homed in' on numerous localities of other unusual more moisture-loving horsetails and horsetail hybrids by first looking for patches of meadow sweet *Filipendula ulmaria* and yellow flag *Iris pseudacorus*, and have seldom been disappointed. These species are good indicators because I found particular fidelity of ecological association (especially in northern Britain), and in each case, their flowers are easier to first spot at a distance than are the green shoots of horsetail amongst other rank vegetation!

Use seasonal differences as further sensitive indicators. Subtle features of pteridophyte phenology such

FERN RECORDING

as differences of detail of seasonal behaviour of fronds of ferns within close taxonomic groups are a small but subtle feature usually ignored by most. But to me, these can give vital clues about unusualness of a taxon in comparison with others in the field. For example, the different taxa of *Pteridium* in Britain (Page, 1997) are strongly different in multiple aspects of seasonal development, including in frond phasing, field texture and colour, this can direct attention to areas in need of closer examination. In another species group in Britain, I have found *Polypodium vulgare* and *P. interjectum*, for example, to display great differences in frond behaviour when exposed to moderate drought (either in summer droughts, or when frost-droughted in winter). Significantly, *P. x mantoniae* behaves intermediately in droughts, enabling colonies to stand-out conspicuously as sites for more detailed examination.

EQUIPMENT

Use a few simple tools. I have always found that a few simple tools are worth their weight in gold when carried in the field. I suggest:

- ❖ A pair of comfortable walking shoes [wellies if the 'going' is likely to be sticky in Britain, strong but light 'fell boots' or similar in the tropics, and everywhere, wet gear as necessary]. I always keep a different pair of shoes in the car for driving, as well as emergency dry clothing.
- ❖ A stout stick [to push brambles aside in Britain, to let snakes know you are coming in the tropics, but which can also act as a photographic monopod anywhere as needed and is something to lean on whilst observing and thinking - the last probably its most tried and tested use].
- ❖ A pair of secateurs [for cutting brambles in Britain and everything grasping in the tropics, but invaluable everywhere for carefully cutting a frond base without damage to its scales, the plant or to you].
- ❖ A notebook [for recording field details and specimens by running number - always number everything in your notebook, with corresponding numbers on related specimens and photographs, and never repeat numbers - mine have now reached over 40,000, representing about a thousand a year!]
- ❖ A portable tape recorder [for recording all those additional habitat details that you would never write down and as you go - in the tropics also take plenty of extra tapes]. It is easy to talk to while walking. Download tapes to form a permanent record on return.
- ❖ A good map [OS in Britain, whatever available in the tropics], waterproof watch, small torch and a reliable compass (that once saved my life and that of the forester with me in mountain forest when it is especially easy to become disorientated, as darkness falls). I have also sometimes carried an aneroid altimeter (heavy and needs

re-setting daily) and more recently a portable GPS in the tropics, but have found that works poorly in thick forests.

- ❖ A basic 'first aid' kit, especially in the tropics. Also, in remote places, from Scottish mountains to tropical forests, never go alone [and always tell someone where you are going and when and where you expect to return, in case you don't]. Dense tropical forests, especially on mountains, can cover and harbour unexpected challenges. I say this with the conviction of someone who has fallen down most vegetation-covered tropical crevasses and been bitten by most things worth being bitten by!

RECORDING

Record by writing down, drawing and photographing, and when necessary collect a specimen of what you see, but do not destroy the plant in so doing. We have much to learn from all aspects of observing and recording of pteridophyte plants, especially from watching the progress of the unusual. Cameras are additional to the above list. I use at least two *Pentax* bodies, several co-compatible lenses including wide-angle and macro, and a range of filters, and most important a rotatable polarising filter - most of the photos in my *New Naturalist* book, for example (Page, 1988), are taken through a polarising filter. Its use is like giving your lens good-quality sunglasses, and I regard this vital accessory as my 'trade secret' for both fern and conifer photography for over 40 years, especially in the tropics, but have only ever encountered one other pteridologist using one (in America, and for the same reasons). Use photographs to support records wherever possible, and collect only a modest voucher specimen of frond only when necessary. Always press it as soon as possible. All individual plants must be left *in situ*, but recorded, so that onward progress and change can be monitored. Do not interfere with nature in monitoring it, and thus do be careful to whom you reveal the locality of any rarity.

Be aware that laboratory data, especially with the wisdom of hindsight, may reveal important and valuable



Carl Farmer recording *Lycopodium annotinum* on Scalpay for www.plant-identification.co.uk/skye

new insights into emerging details of the taxonomy of what you have observed and collected. Be aware that in evolution and ecology, details and dynamics are seldom simple, and the evolutionary picture may indeed be exceedingly complex. For example, using cytological techniques, I once showed that a tropical fern genus of about half a dozen named species consisted of at least twenty recognisable cytotypes which would each rank as separate species in Europe, so never underestimate complexity. Even in modern times (perhaps *especially* in modern times) fieldwork leads to the discovery of new issues in the field which often then need to be further cross-checked by more detailed laboratory means. This is clearly the cornerstone of much taxonomic and evolutionary advance within pteridophytes. It thus contributes enormously to the continuing vitality, as well as progress of, the subject. Today, molecular people do delight in telling you that you were 'wrong', when you know that the reason you collected that material, questioned it in the first place and drew their attention to it for further analysis was expressly for the purpose of finding out more about it!

SELF DISCIPLINE

Do not be in a hurry, and do not be too deskbound. We seem to live in times when if you are not sat at a desk, you are regarded as not working! This has especially been my own experience in latter years, though I was fortunate in earlier decades to have a Director who appreciated that all the most worthwhile observations benefit from time spent in the field, and the fundamental stimulus to biological thought and progress thereby gained. Ensure that field studies are an exercise in observation and deduction at the pace of quiet perseverance and unhurried patience, and should never be made into a route march or endurance test (which is why I prefer not to work on organised 'Society' field meetings). And having made an observation, don't just close your notebook and forget it. Accept that observations need time to make and reflect upon, and also often need repeat visits at different seasons to follow up initial unusual data. Think about the inter-relationships of plant and place, of space and location, and of setting within time, and discuss the unusual with others, especially those with local knowledge. Feed observations to recorders and *via* referees as necessary, and always make a point of depositing all novel information to your best ability locally - don't just disappear with it. From this point of view, I have always tried to base myself with

local foresters or Universities or herbaria overseas, for you are an Ambassador for your subject and it is locally that information is often most appreciated, and where initial observations can be followed up and local staff encouraged.

TRAVEL

I have been fortunate enough to have spent nearly all of my life travelling. In addition to half a century of temperate studies, my log shows that I have made well over 100 mostly long-haul flights, and have spent a total of more than 7 years on expeditions in the tropics. For both ferns and conifers, I have been fortunate in visiting every continent but Antarctica, and a majority of islands, both large and small, across all of the world's oceans. There are few negative sides to travel. The only one with any consequences for me personally is that having been jabbed against everything that medical science could think to jab me against, I have instead been bitten by everything that seems worth being bitten by, usually also on most continents. But this is a hazard of entering so many different environments for which, at the time, you have made yourself an integral part. In all, I have driven in scores of countries, flown myself in some, slept 'rough' in the forest in many, and walked and climbed sometimes even to where the proverbial hand of man had never previously set foot. All have been different, all have been memorable, inspiring, and the source of much scientific information, especially on the ecology of unusual members of both my plant groups. The more you travel, the more you observe, the more you realise that there is more to be found, and the more you encounter, the more you appreciate that you never stop learning.

REFERENCES

- Page, C.N. (1988). *Ferns. Their Habitats in the British and Irish Landscape*. Collins New Naturalist: London & Glasgow.
- Page, C.N. (1997). *The Ferns of Britain and Ireland*. 2nd edition. Cambridge University Press, Cambridge.
- Page, C.N. (2005). Why record ferns? *Pteridologist* 4: 120-122.
- Page, C.N. (2006). Fern range determination in the Atlantic Arc by an environment of complex and interacting factors. In Leach, S.J., Page, C.N., Peytoureau, Y. & Sandford, M.N. (eds.) *Botanical Links in the Atlantic Arc*. BSBI, London.



MYTH & MYSTERY

The myths

The most widely propagated myths relating to ferns concern the fern spores, or 'seed' as they were originally called (*Pteridium aquilinum* 'seed': right). The essential feature of the different versions found throughout Europe is that fern 'seed', collected at midnight on St John's Eve (June 23) has magical powers and, according to some traditions, is said to be able to confer invisibility if either placed in a shoe or swallowed.

This idea was clearly well established in popular British folklore 400 years ago as revealed by the fact that it features in several published works. Shakespeare refers to it, without introduction or explanation, in Henry IV Part 1.¹ Gadshill, a dishonest crony of the dissolute Prince Hal and Sir John Falstaff, has been sent to an inn by the Prince to identify travellers who could be robbed for sport. Gadshill says to Chamberlain, a co-conspirator:

"We steal as in a castle, cocksure; we have the receipt of fern seed, we walk invisible".

To which Chamberlain, clearly sceptical of the scientific basis of the claim, replies:

"Nay, by my faith, I think you are more beholden to the night than to fern-seed for your walking invisible".

About 30 years later, Ben Jonson refers to it in his comedy "The New Inn"² The play is set in the "Light Heart Inn" in Barnet. The plot of "The New Inn" is full of convoluted domestic and social intrigues. Lovel is a gentleman soldier staying at the Inn (perhaps for the Barnet Horse Fair which still takes place every September). He is talking to his servant Ferret (a sort of Baldrick to his Blackadder) and he wants to know why Ferret (also known as Stote, revealing some zoological inexactitude) allowed himself to be seen by some newly arrived guests including Lady Frampul, a lady from his past

FERN SPORES ARE MAGIC

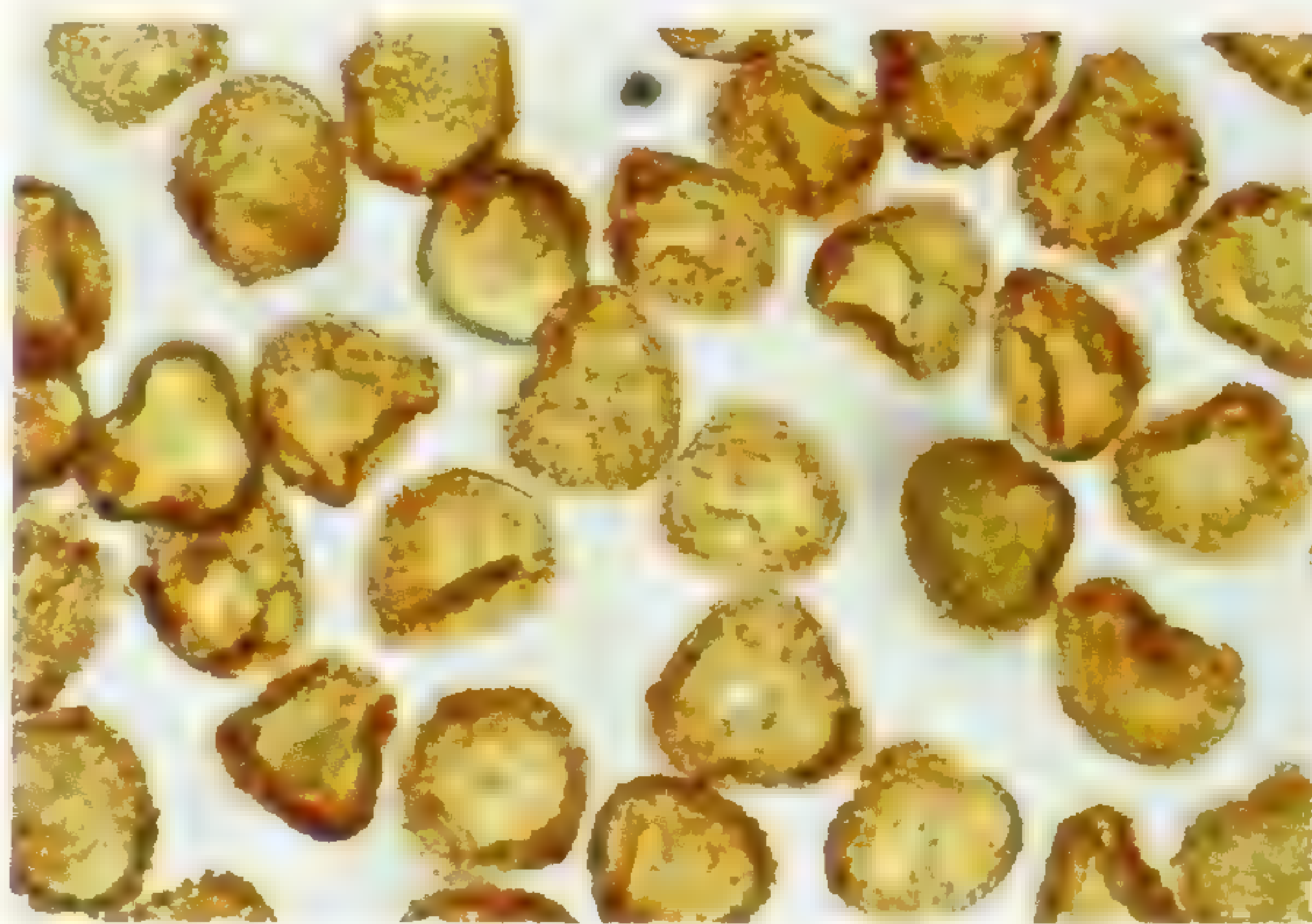


PHOTO: BARRY WRIGHT

A Matter of Mystery and Midsummer Myths

Adrian Dyer

499 Lanark Road West,
Balerno, Midlothian, EH14 7AL

whom he is trying to avoid. Lovel asks: "Why were you seen?" to which Ferret replies:

*"Because indeed I had
No medicine, Sir, to goe invisible;
No ferne seed in my pocket"*

However, although all these and other authors were clearly familiar with the supposed ability of fern 'seed' to render invisibility, they may not have been aware that a successful outcome depended on attention to detail when obtaining and using the 'seed'. According to Ward (1999), legend states that precisely at midnight on St John's Eve, the moment of St

Figure 1.



J. DYER



John's birth, the fern blooms quickly and releases vast quantities of invisible 'seed'. According to Abbe (1981), the fern 'seed' must be gathered from the tallest and thickest ferns and by moonlight. A stack of 12 pewter plates, representing the 12 apostles of Jesus, must be placed beneath the fern and as the 'seed' falls from the fronds it passes through the plates to rest invisibly on one of them. In some versions, the 'seeds' collect on the twelfth plate (Heath, 1885; Folkard, 1892).

Heath (1885) records the case of a "respectable countryman" from Heston, Middlesex, who recalls that when he was a young man in the latter part of the 18th Century he was often present at the ceremony of catching the fern 'seed' at midnight on the Eve of St. John the Baptist. However, the attempt was often unsuccessful because the 'seed' had to be allowed to fall into the plate of its own accord without shaking the plant.

Occasionally, the spores were collected inadvertently, with alarming results. Folkard (1892) writes:

"The people of Westphalia are wont to relate how one of their countrymen chanced one Midsummer night to be looking for a foal he had lost, and passing through a meadow just as the Fern-seed was ripening, some of it fell into his shoes. In the morning he went home, walked into the sitting room, and sat down, but thought it strange that neither his wife, nor indeed any of the family, took the slightest notice of him. "I have not found the foal," he said. Everyone in the room started and gazed around with scared looks, for they had heard the man's voice, but saw no one (Figure 1.).

Thinking that he was joking and had hid himself, his wife called him by



Figure 2.

... bracken produces a blue flower at dusk that releases a ripe seed at midnight ...

his name. Thereupon he stood up, planted himself in the middle of the floor, and said, "Why do you call me? Here I am right before you." Then they were more frightened than ever, for they had heard him stand up and walk, and still they could not see him. The man now became aware that he was invisible, and a thought struck him that possibly he might have got Fern-seed in his shoes, for he felt as if there was sand in them. So he took them off, and shook out the Fern-seed, and as he did so he became visible again to everybody."

Two interesting features of this story are that the invisibility was reversible, though perhaps it would not have been if the 'seeds' had been swallowed, and that the man affected apparently could see himself and did not realise he was invisible to others.

Variations on a theme

The many variations of this myth include one which makes the assertion that the fern, in this case implied to be bracken, produces a blue flower at dusk (Fig. 2) that releases a ripe 'seed' at midnight which, if caught in a white napkin, renders the possessor invisible (King quoted in Friend, 1884; Abbe, 1981). In other stories, the 'seeds'

collected at this time are reputed to glow like golden fire (Friend, 1884; Jordan, 1997). In a French version (Gubernatis, 1882) it is made clear that the collector must be barefoot, in a chemise and in a "state of grace".

Fern 'seed' was credited with other powers as well as the conferment of invisibility. If a girl scatters spores on the way home half an hour after collecting them at midnight on St John's Eve, by looking over her shoulder she would see her future husband mowing the phantom crop of ferns with a scythe (Whitlock, 1979). In a variant of this, if a maiden ate fern 'seed' and then visited the village churchyard, the first eligible male she saw would be destined to be her future husband (Freethy, 1985). Folkard (1892) quotes a poem by Bidlake which relates a similar story.

In Russia, there is a claim that the 'seeds' confer second sight or, if thrown into the air, will land at the site of buried treasure (Jordan, 1997). In Swabia, the story is that fern 'seed' brought by the devil between eleven and midnight on Christmas night enables a man to do the work of 30 (Folkard, 1892). According to another telling of the legend, the devil was obliged to bring to the person receiving

the invisible 'seed' magical powers to open locks. The 'seed' was also supposed to confer protection against thunder and lightening as well as evil spirits, which encouraged the growing of ferns on walls and roofs and, according to an Elizabethan MS, led to the advice to "*Gather fearne seed on Midsomer Eve and weare it about thee continually*" (Friend, 1884). The 'seeds' were also believed to provide an antidote to snake bites (Jordan, 1997).

In some accounts it is made clear that spore collection was not without its hazards. One French authority (Bovet, quoted in Gubernatis, 1882) recounts that all the time that fern spores were being collected, spirits whistled past his ears like bullets, knocking off his hat and striking all parts of his body.

In some versions, it is not 'seeds' that are sought, but the flowers. Ferns were said to have been rendered flowerless by a curse put on them by St. Patrick of Ireland as a punishment for harbouring snakes (May, 1978). An alternative explanation, specific to bracken, was that it was the only plant in the straw of the manger that failed to produce blossoms in honour of the birth of Christ, and it has never flowered since. According to a German story, flowers are formed but are rarely seen because they open for only a minute at midnight on St John's Eve.

In Gubernatis' account (Gubernatis, 1882, repeated in Folkard, 1892), a version relayed from a Russian peasant by Princess Marie Galitzin Prazorovskaia states that in order to see the flowers, it is necessary to go before midnight to the place where the fern grows, taking with you a white napkin, a cross, a Testament, a glass of water and a watch. With the cross, you trace a large circle round the fern, then spread the napkin and place on it the cross, the Gospels and the glass of water. You look at the watch; on the stroke of midnight, the fern flowers. Then look carefully; this is the chance to see not only the Fern-seed drop but also at the same time a multitude of

MYTH & MYSTERY

other marvellous things: for example, three suns, and a full moon that reveals everything, even that which is most hidden; also you hear laughing and you become aware of someone calling. You must not be afraid of any of this but if you remain calm, you will learn everything in the world that is happening and all that will happen.

In a variant of this, also from Russia (Gubernatis, 1882; Folkard, 1892), it is stated that buds on the fern open at midnight to reveal dark red flowers that illuminate all the surrounding area. In yet another version, the blossom is golden (Jordan, 1997).

Origins of the myth

What was the origin of the idea that fern spores confer invisibility? Although botanists gradually established during the 17th Century that new fern plants arose from the “small dust” that could be collected from the leaves (Parkinson, 1640; Morison, 1699), at the time of Shakespeare and Jonson for many people the way in which ferns reproduced was a mystery. For those who were not aware of the “small dust” and its significance, fern reproduction was magical; it apparently occurred without flowers or seed.

The belief that ferns reproduced without seed appears in literature of the time. In his herbal, first published as “The English Physitian” in 1652, Culpepper refers to “...brakes, the seed of which some authors hold to be so rare”. Samuel Butler, in a satirical romance derived from “Don Quixote” and called “Hudibras” (Part 3, first published in 1680; (Grey, 1744)), writes:

“Who wou’d believe,
what strange Bugbears
Mankind creates it self, of Fears
That spring, like Fern,
that Insect-Weed
Equivocally, without seed?”

(The reference to “Insect-Weed” is based on the supposition that the fern was propagated by “equivocal” (i.e. spontaneous) generation, as was

supposed for bees and other insects.)

In a footnote to an edition of “Hudibras”, Grey (1744) points out that Pliny stated in AD77 that two kinds of fern have neither flowers nor seeds: “*Filicis duo genera nec Florem habent, nec Semen.*” The idea clearly has a long history.

From the observation that ferns increased even though no flowers or seed were seen developed the idea that fern ‘seed’ was formed but was invisible. A reference to invisible seed is found in a short untitled (and undated) poem attributed to William Browne (1590-1645?) by E. Brydges and first published by him (Brydges, 1815):

“Poor silly fool!
Thou striv’st in vain to know
If I enjoy or love where thou lov’st so;
Since my affection ever secret tried
Blooms like the Fern,
and seeds still unespied.”

This in turn probably led to the belief that, if properly used, fern ‘seed’ could itself confer invisibility. This prediction might have been prompted by the widely accepted Doctrine of



Figure 4. The first published illustration of the stages of the fern life cycle, showing the spores and the developing gametophytes even though the alternation of generations and the involvement of antherozoids and egg cells in archegonia was not recognised at that time. Taken from John Lindsay’s classic paper (1794).

Signatures as popularised by Theophrastus Bombast von Hohenheim (aka Paracelsus, 1493-1541), whereby medicinal properties were assigned to plants according to their fancied resemblance to parts of the human body. Such an explanation for the origin of the myth was suggested as early as 1794 by John Lindsay in his classic paper (Lindsay, 1794) containing the first published description, with illustrations, of the stages of the fern life cycle, including gametophyte development (Figure 4.). He writes:

“It was not generally known many years ago that ferns bore any seed; hence the notion of its power of rendering whomever possessed it invisible.”

The fact that the idea of fern ‘seed’ having magical powers is established in folklore over a wide area from Britain to Russia suggests that it has early origins. Moreover, if fern flowering was a magical and mystical process, it seemed probable that it occurred on a night when “all the hosts of elfland are abroad in greatest power” (King, quoted in Friend, 1884), namely Midsummer’s Eve, also known as St. John’s Eve. The date for the Feast of the Nativity of St. John the Baptist, one of the principal feasts of the Christian church as early as the 5th Century, was established long ago as June 24. In a long history intertwined with that of observance of the summer solstice, June 23 became the date for both Midsummer’s Eve and St. John’s Eve. Popular tradition came to associate St. John with numerous marvels of the plant world (Folkard, 1892), and St. John’s Eve with a variety of strange happenings and special observances. One of these was the possession of magical properties by fern spores collected on that night. It is more difficult to explain how the different variations and elaborations of the fern spore myth arose. Perhaps other beliefs relating to St John’s Eve and Midsummer’s Eve became incorporated locally.

MYTH & MYSTERY

Is it a myth?

The experimental approach

Not everyone believed that fern spores had magic powers, even in the 16th Century. While pointing out that several ferns, including *Adiantum capillus-veneris*, *Asplenium rutamuraria*, *A. scolopendrium*, and *A. ceterach*, lacked flowers and seeds, Lyte (1578) also referred to two kinds of “ferne or brake”, and commented, in relation to one of them, “*The male ferne, Filix Mas*”, that “*This kind of fern beareth neither flowers nor seede, except we shal take for seede the blacke spotted growing on the backsides of the leaves, the whiche some do gather thinking to worke wonders, but to say the trueth, it is nothing els but trumperie and superstition.*” Until the first edition of Gerard’s Herbal was published in 1597, Lyte’s book was almost certainly the source of botanical knowledge for Shakespeare (Blunt and Raphael, 1979), so perhaps the scepticism expressed by Chamberlain in the quotation above from Henry IV, Part 1, is a reflection of Lyte’s view.

However, popular belief in the myth probably persisted beyond the 17th Century. Folkard even claimed that a belief in the mystic power of fern “seed” was still extant when he wrote his article in 1892, even though this belief would have been gradually undermined during the 19th Century once the true facts of fern reproduction were known. This process would have begun with the publication of Lindsay’s paper (Lindsay, 1794). Lindsay became “*acquainted with the fructification of ferns*” while a student of John Hope at Edinburgh University. Subsequently, in Jamaica, he used a microscope to study development after sowing the “*powder or dust, which falls from the fern leaves when drying*” onto “*mould*” in pots placed in the window of his room. Even though the true nature of the “dust” was not understood until well into the 19th Century, and Lindsay continued to think of the spores as ‘seeds’, his study removed much of the mystery of fern reproduction. While it would have

taken some time for this understanding to diffuse into common knowledge, his publication probably marked the beginning of the end for the folklore of invisibility conferred by fern spores.

Despite this, and the counsel of common sense, the idea of testing the myth is almost irresistible. However, for those of us wishing to experiment with magical spores, important questions of practical detail arise.

First, which species should be used? The necessary species is usually not made clear, though Bracken (Friend, 1884; Abbe, 1981), Male Fern (Abbe, 1981) and Royal Fern and Polypody (Friend, 1884) have been specifically mentioned. Reference simply to “fern”, as in the quotation above from “Hudibras”, probably often meant bracken.

Second, are there any European ferns releasing spores as early as June 23? A sceptical Hieronymous Bock (1552) had investigated this question in Germany nearly 500 years ago (Figure 5.).

In a 16th Century translation of the 1539 edition of his herbal, quoted by Blunt and Raphael (1979), Bock states:

“*I have foure yeres together one after an other upon the vigill of saynt John the Baptiste (whiche we call in Englishe mydsomer even) soughte for this sede of Brakes upon the nyghte, and in dede I fownde it earlye in the mornynge before the daye brake, the sede was small blacke and lyke unto poppye. I gatherid it after this manner: I laide shetes and mollen [mullein?] leaves underneth the brakes whiche receyved the sede.... I went aboute this busyness, all figures coniurynges, saunters, charmes, wytchcrafte, and sorseryes sett a syde, takynge wyth me two or three honest men to bere me companye.*”

Thus, while not endorsing the associated myths, he did confirm that at least one species, probably bracken, was releasing “seeds” on June 23, at least in southern Germany. In Britain, of the species mentioned in the myths, Royal Fern is releasing spores by this date, at least in warmer parts of Britain, but Bracken, Male Fern and Polypody are not (Page, 1997). Perhaps this is an indication that the myth originated in southern Europe.



Figure 5.

A page from Bock (1552) with illustrations of two large ferns: *Filicis maioris primum genus* (recognisable as *Pteridium*) and *Filicis maioris alterum genus* (clearly *Osmunda regalis*).

From the collection of the Royal Botanic Garden Edinburgh, photographed by permission.

MYTH & MYSTERY

According to Page (1997), spores are being released in Britain in late June by *Adiantum capillus veneris*, *Asplenium adiantum-nigrum*, *A. ruta-muraria*, *Athyrium distentifolium* (including var. *flexile*), *Botrychium lunaria*, *Cystopteris fragilis* (including *dickieana*), *Ophioglossum vulgatum*, *Osmunda regalis*, and *Woodsia alpina*. However, of 34 native fern species (including *O. regalis*, *A. adiantum-nigrum* and the *Athyrium*, *Cystopteris* and *Woodsia* species listed above) grown outside in my garden near Edinburgh (latitude 56° 52' N and altitude c.150 m), in recent years only a rugose-spored form of *Cystopteris fragilis*, originally collected as spores from plants along the sides of Lawers Burn, released spores by June 23.

However, this was sufficient to enable me to conduct an experiment. On June 23, 2001, I collected spores of *Cystopteris fragilis* in my garden. Some months later, I placed some spores in the heel of my right shoe, while I was wearing it. It was with a mixture of disappointment and relief (bearing in mind that few accounts comment on the reversibility of the process) that I discovered that I was still visible to others present.

However, because I had not observed all the stipulated requirements for obtaining and using the spores, this did not conclusively disprove the myth. More experimentation is needed. I urge members of the BPS to collect spores under the correct conditions on the next St John's Eve and to test the effect of the spores. Maybe you have acquaintances whose disappearance you would like to bring about. The results should be written up, using visible ink even if (especially if) the experiment is successful, and submitted to the Editor of the *Pteridologist* for a future issue. Instances of induced second sight or the discovery of treasure should also be reported. Colour photographs of fern flowers would be welcome, and pictures of pteridological colleagues attired in a chemise and a state of grace while circling their chosen fern would be quite irresistible.

Notes

¹ Act 2, Scene 1, lines 85-90; probably first performed in 1596

² First performed 19.1.1629; Herford, Simpson and Simpson, 1938.

³ Nat. Hist. xxvii ix 55.

References

- Abbe, E. (1981). *The Fern Herbal*. Abbe, Vermont.
Blunt, W. & S. Raphael (1979). *The Illustrated Herbal*. Frances Lincoln, London.
Bock, H. (1552). *De Stirpium Historia*. Pp.542-544.
Brydges, E. (1815). *Original poems never before published by William Browne*. p.26. Lee Priory, Kent.
Culpepper, N. (ND; c.1800). *The British Herbal and Family Physician*. Nicholson, Halifax.
Folkard, R. (1892). *Plant Lore, Legends, and Lyrics*. 2nd. Edition. Sampson Low, Marston & Co., London.
Freethy, R. (1985). *From Agar to Zenry*. Crowood Press, Marlborough.

Friend, H. (1884). *Flowers and Flower Lore*. W. Swan Sonnenschein, London.

Grey, Z. (1744). *Samuel Butler "Hudibras"*. Part 3, canto III, lines 1-4. p.355. J. Bettenham, London. (The same wording with different punctuation appears in the H G Bohn edition, London, 1859, and the J. Wilders edition, Clarendon Press, Oxford, 1967)

Gubernatis, A. de (1882). *La Mythologie des Plantes*. Reinwald, Paris.

Heath, F.G. (1885). *The Fern World*. Sampson Low, Marston, Searle and Rivington, London.

Herford, C.H., P Simpson & E. Simpson (1938). *Ben Jonson* Vol.6, p.418. ('The New Inn', Act 1, Scene 6, lines 16-18.) Clarendon Press, Oxford.

Jordan, M. (1997). *Plants of Mystery and Magic*. Blandford, London.

Lindsay, J. (1794). Account of the Germination and Raising of Ferns from the Seed. *Transactions of the Linnean Society* 2, 93-100.

Lyte, H. (1578). *A Nievve Herball. The Thirde Booke of the Historie of Plantes*. Chapter lx, p.401. London. (This is a translation into English of the French translation by C. Clusius of *Cruydeboeck* (1554) by R. Dodoens.)

May, L.W. (1978). The economic uses and associated folklore of ferns and fern allies. *The Botanical Review* 44 (4), 491-528.

Morison, R. (1699). *Plantarum Historiae Universalis Oxoniensis*. Pars tertia.

Page, C.N. (1997). *The Ferns of Britain and Ireland*. 2nd. Edition. CUP, Cambridge.

Parkinson, J. (1640). *Theatrum Botanicum*. Thomas Cotes, London.

Ward, B.J. (1999). *A Contemplation upon Flowers*. Timber Press, Oregon.

Whitlock, R. (1979). *In Search of Lost Gods*. p72. Phaidon, Oxford.

...the collector must be barefoot,
in a chemise and in a state of grace.
(Gubernatis, 1882)



J. DYER

FERN ECOLOGY

ALPINE LADY FERNS

are they suffering with climate change?



Figure 1. Late snow lie in the hills above Bridge of Orchy in spring 1995.



Heather McHaffie

RGBE, 20A Inverleith Row,
Edinburgh EH3 5LR

Late Snowbeds

In Scotland we have high altitude sites that can retain snow for up to six months during the winter. These sites are the product of a combination of aspect, the prevailing winds and local geography (Figure 1). The first snow usually falls in October and builds up to a maximum in March after which it melts by the end of May, although in some years it can last until July. (The longer-lasting snowbeds, that are nearly permanent, have a specialised flora of lichens and bryophytes and are not considered here.)

Snowbeds that last over most of the winter have a restricted range of species as not many plants can tolerate long periods in anoxic conditions. This reduces the competition and creates conditions in which many ferns, and some other plants, can survive. Snow cover also has an important role in maintaining an even temperature, as once the snow has accumulated the temperature remains at zero for the rest of the winter. This protects the ferns from severe low temperatures that they otherwise could not tolerate.

Paradoxically, in addition to keeping the ferns warm the snow also keeps the ferns cold. Without snow there is the danger that the ferns might start to grow in an early spring, and the new growth be affected by frost. Once the ferns are released from the snow they grow very rapidly. Alpine Lady-fern *Athyrium distentifolium* and Parsley Fern *Cryptogramma crispa* are the dominant species in this type of vegetation. At these altitudes *Cryptogramma*, together with *Oreopteris limbosperma* and *Blechnum spicant*, require winter snow cover to survive, although they also grow at lower levels, unlike *A. distentifolium*.

The Survey

In the mid 1990s I spent three years visiting fern beds and monitoring Alpine Lady-fern populations. I was able to observe the varying patterns of snow deposition and the response of the ferns to differing durations of snow cover, and studied this in detail at two sites. The first is near Bridge of Orchy, in the corrie between Meal Buidhe and Beinn Achallader, and the second is a smaller site in Glen Prosen which is unusual in being south-facing. The latter site was the original type locality for the variety *A. distentifolium* var. *flexile* (see cover).

In 1995 the longest-lasting snow clearly marked the locations of the fern beds (Figure 2), but in 1996, during the main periods of snow fall, the wind came from a different direction than usual and there was less snow on the fern beds. However, although nearly all the snow had melted by the end of April, the ferns did not begin to grow until the beginning of June, as they had done in the previous year.

The Prosen site had good snow cover in 1996 but in 1997 both areas had a reduced amount of snow and the fern beds were uncovered by April. 1997 was

The big clumps that I had monitored were reduced to only one or two crowns with very small fronds.

ALPINE FERNS & SNOWBEDS

unseasonably warm in early May and the ferns at Glen Prosen started to grow. In mid-May there was a frost and there were many blackened and drooping fronds. The plants recovered but fewer fronds were produced in that season. Subsequent visits up to 2004 showed good recovery, but this was an indication of the effect that variable snow cover can have. I recalled reading a paper in which McVean (1958) described seeing frost damage or dead vegetation where the snow was either inadequate or unduly prolonged.

Interestingly, McVean suggested that there was evidence of a change in the species composition of the snowbeds, so there will always have been a certain amount of fluctuation.

Frozen Ferns

In 2001 I visited the Bridge of Orchy area again together with a group of BPS members. The estate had decided to remove the sheep and encourage deer instead, and the ferns had been grazed more than I had seen previously. Only the golden-scaled stipes remained of one plant of *Dryopteris expansa*, with *Dryopteris* being the preferred food-plant. Some of the *Athyrium* had been nipped off and then dropped, but in general this was as rich and lush a corrie as I remembered it, with large quantities of *A. distentifolium*, *A. distentifolium* var. *flexile*, and some *A. filix-femina*, *D. expansa*, *D. oreades*, *D. affinis* and *D. dilatata*, *C. crispa*, *B. spicant*, *Phegopteris connectilis*, *Gymnocarpium dryopteris*, *O. limbosperma* and *Cystopteris fragilis*.

My next visit was in 2003 with cloud hanging round the tops and the usual damp climate prevailing. As we came over the lip of the main corrie I looked towards the fern beds but was unable to see the clumps of ferns that were usually visible covering the screes. As we came closer I still could not see any ferns at all, just tumbled rocks and long grass.



Figure 2.
Snow beds - fern beds

My first thought was that the grazing pressure had been such that the ferns had been eaten into extinction, but closer examination showed that there were a few small fronds present, mostly ungrazed. I tried to re-find the big clumps with marked crowns that I had monitored, but they seemed to have been reduced to only one or two crowns with very small fronds.

All was made clear when we returned to our B&B at Achallader Farm to be told that there had been no snow on the ground from January onward. So the ferns had been frozen and many had not survived.

I subsequently visited other areas, such as the Great Corrie at Ben Alder where there were some signs of damage to the ferns, but nowhere else have I seen a similar effect over such a large area as at the Bridge of Orchy site. There were a few surviving clumps of vigorous *D. expansa* and *A. distentifolium* growing among exceptionally large boulders. Perhaps they received additional shelter or some snow

had been retained in the deep crevices.

Owing to inclement weather I had not taken a camera but resolved to return with my monitoring notes to try to quantify the damage. It was not until 2005 that I could return to the hill [accompanied by the editor who was both delighted to visit these rare ferns and appalled by their sorry condition - ed.].

This was the third growing season since the initial fern-freezing event and still the surviving ferns were very small. I took a photograph to repeat a particularly favoured view of one scree that had formerly been so ferny (Figure 3) and the only fern clearly visible was a small clump of *Cryptogramma* near the front (Figure 4). With difficulty I re-found 16 out of 20 marked plants. The actual plants that I had measured were usually dead as I generally chose the extreme right hand crown of a clump, but there was enough of the rhizome left to show something.

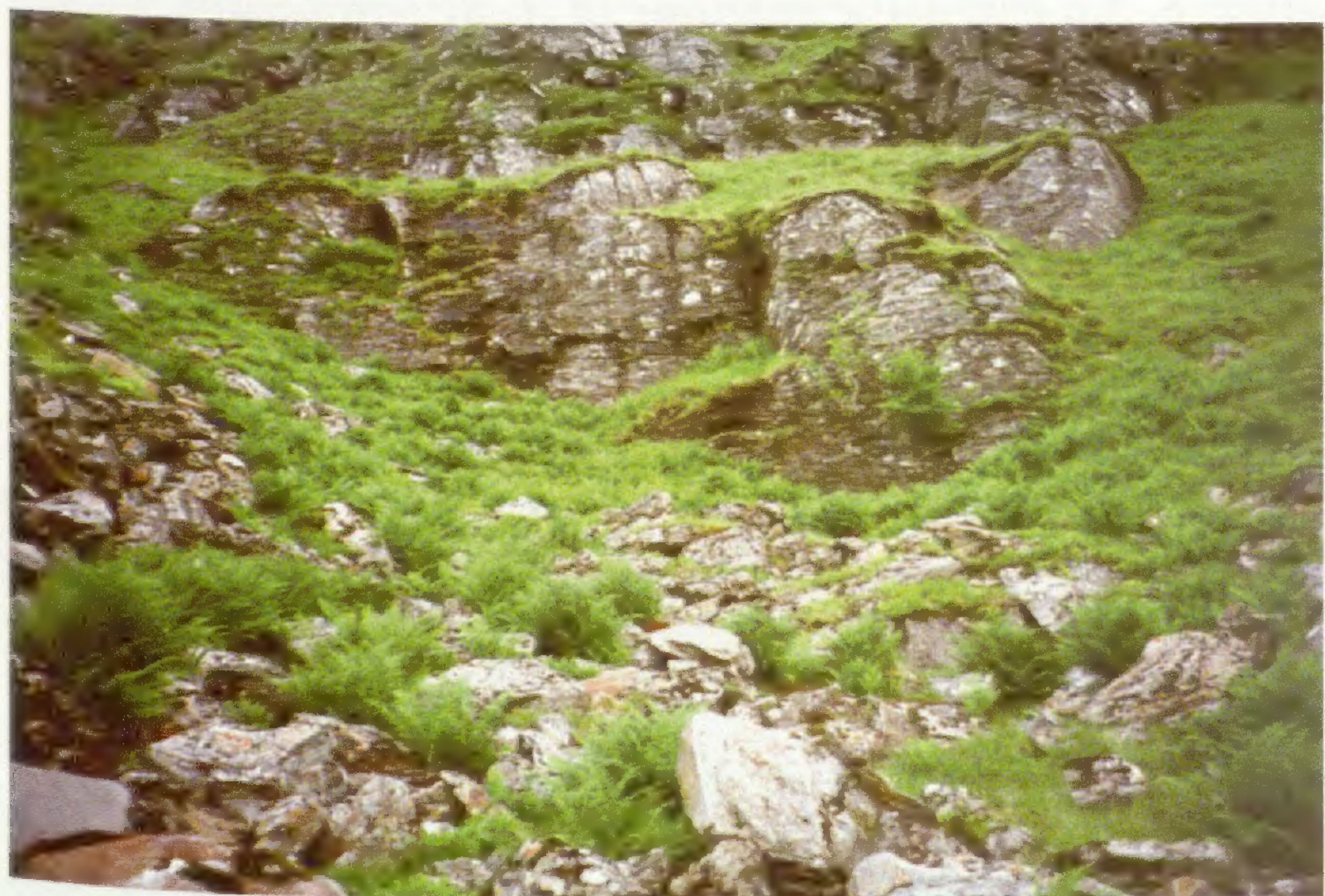


Figure 3. BEFORE: Corrie at Bridge of Orchy in 1996.

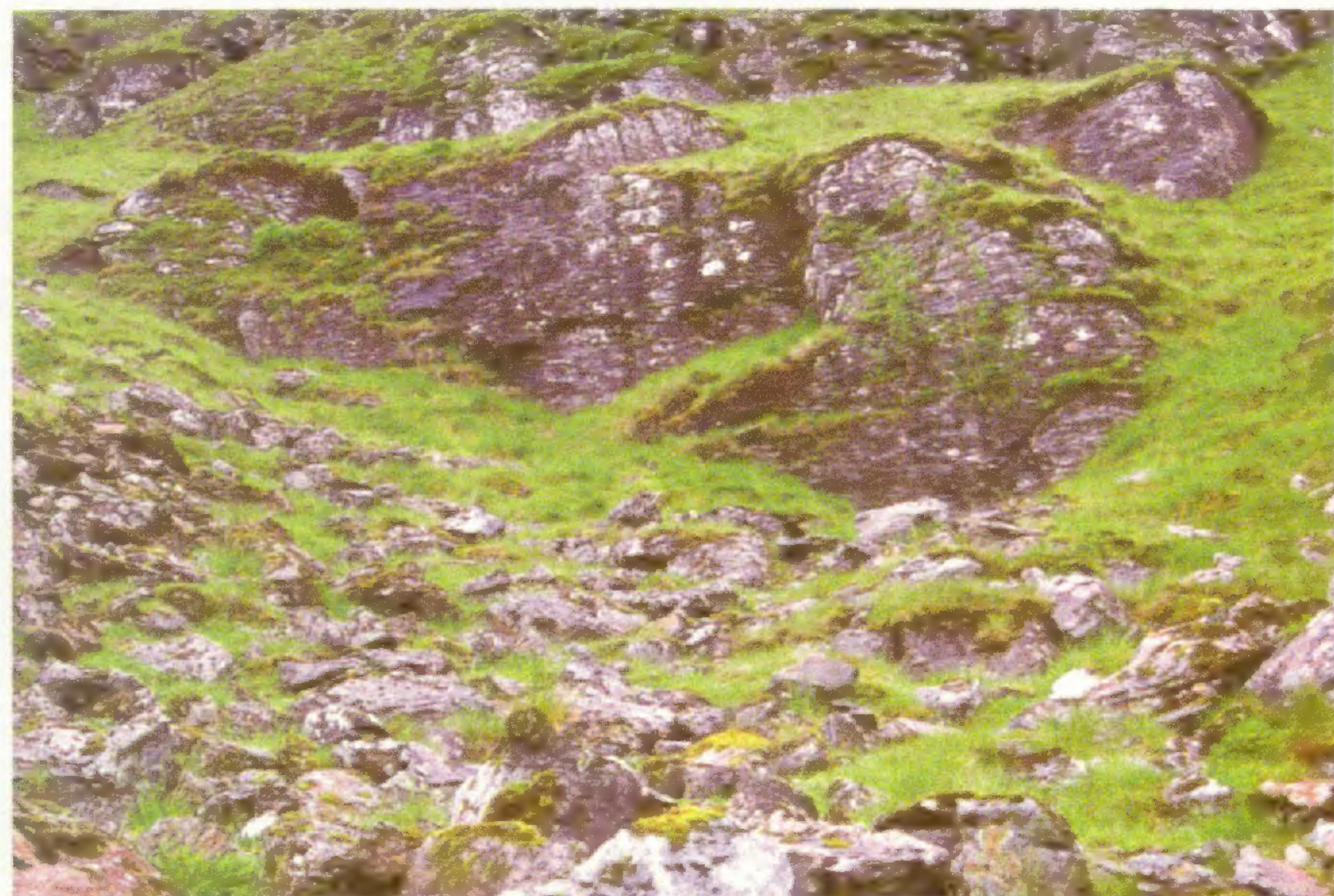


Figure 4. AFTER: Corrie at Bridge of Orchy in 2005.

ALPINE FERNS & SNOWBEDS

The remains were usually a large black-brown mass with a few surviving crowns producing small fronds mostly only 10-15 cm long (see Figures 5 & 6 and compare with 1996 photographs, Figure 7). This contrasted with ferns that were formerly up to 70 cm tall. Very few of the surviving ferns were fertile, although a few were. It seemed to be advantageous for the crown to be deeply buried by mobile scree.

Many other populations of *Athyrium distentifolium* in Scotland are small plants, frequently not sporing. I had assumed that low pH and lack of nutrient was the main reason. There are some very large plants, mainly in areas with calcareous rocks, but the Bridge of Orchy population had been unusually robust (although only pH 4.5) with most of the ferns producing spores. While the rock type will undoubtedly have an influence on plant vigour, the sudden reduction of a lush population to smaller non-sporing plants, suggests a process which might affect the Scottish sites.

While this event is a clear indication of the possible effects of climate change, it is possible that many of the populations with small infertile plants might have been affected by lack of snow cover, with varying degrees of severity. Continental plants, growing on calcareous rocks at the top of the treeline and with more consistent snow cover, appear to be more vigorous (Schaminée *et al.*, 1992).

A Final Thought

A. distentifolium grows in arctic-alpine regions around the northern hemisphere while its variety *flexile* is only found in

Scotland. *A. distentifolium* var. *flexile* can produce spores when growing in soils with lower nutrient levels than is normal for the usually larger *A. distentifolium* (McHaffie *et al.*, 2001). It is, therefore, admirably adapted to coping with occasional events that more severely affect the normally larger *A. distentifolium*.

The Bridge of Orchy population is the most south-westerly known population that includes both *A. distentifolium* and *A. distentifolium* var. *flexile*. The presence of a high proportion of *flexile* suggests strong selection pressure for this taxon and lack of snow cover in our variable oceanic climate could go some way towards explaining why there are only a few large populations that include both taxa. As these populations are monitored over the next few years it will be interesting to compare the recovery of *flexile* and *distentifolium*. It might be that *flexile* recovers more quickly and it is in the sites that suffer irregular snow cover that it has a competitive advantage.

References

- McHaffie, H.S., Legg, C.J. & Ennos, R.A. (2001). A single gene with pleiotropic effects accounts for the Scottish endemic taxon *Athyrium distentifolium* var. *flexile*. *New Phytologist* **152**: 491-500.
- McVean, D.N. (1958) Snow cover and vegetation in the Scottish Highlands. *Weather*, **13**: 197-200.
- Schaminée, J.H.J., Coolen, C. & Siebum, M.B. (1992). The vegetation of snowbeds in the Monts du Forez (Massif Central, France). *Phyto-oecologia* **21**: 175-200.



Figure 5. *Athyrium distentifolium* (plant code Ad10) - July.

2005



PHOTO: JAMES MERRYWEATHER

Figure 6. An extensive rhizome of *A. distentifolium* with minute fronds (< 10 cm) following frost damage - August.

1996



Figure 7. *Athyrium distentifolium* (plant code Ad10) in a late May; b July; c mid August.

THE BRITISH PTERIDOLOGICAL SOCIETY

Registered Charity No. 1092399

Patron: HRH The Prince of Wales

Officers and Committee from March 2006



- President:** Dr A.F. Dyer, 499 Lanark Road West, Balerno, Edinburgh EH14 7AL E-mail: President@eBPS.org.uk
- Vice-Presidents:** M.H. Rickard, Prof. B.A. Thomas
- Honorary General Secretary:** Dr Y.C. Golding, 7 Grange Road, Buxton, Derbyshire SK17 6NH
E-mail: Secretary@eBPS.org.uk
- Treasurer:** Mrs G. Smith, Rookwood, 1 Prospect Road, Oulton Broad, Lowestoft, Suffolk NR32 3PT
E-mail: Treasurer@eBPS.org.uk
- Membership Secretary:** M.S. Porter, 5 West Avenue, Wigton, Cumbria CA7 9LG Tel. 016973 43086;
E-mail: Membership@eBPS.org.uk
- Meetings Secretary:** P.J. Acock, 13 Star Lane, St Mary Cray, Kent BR5 3LJ; E-mail: Meetings@eBPS.org.uk
- Conservation Officer:** Dr H.S. McHaffie, Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR;
E-mail: Conservation@eBPS.org.uk
- Conservation Officer/Recorder:** Dr R.J. Rumsey, Department of Botany, The Natural History Museum, Cromwell Road, London SW7 5BD; E-mail: Conservation@eBPS.org.uk; Recorder@eBPS.org.uk
- Editor of the Bulletin:** Miss A.M. Paul, Department of Botany, The Natural History Museum, Cromwell Road, London SW7 5BD; E-mail: Bulletin@eBPS.org.uk
- Editor of the Fern Gazette:** Dr M. Gibby, Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR;
E-mail: FernGazette@eBPS.org.uk
- Editor of Pteridologist:** Dr J.W. Merryweather, 'The Whins', Auchtertyre, by Kyle of Lochalsh IV40 8EG;
E-mail: Pteridologist@eBPS.org.uk
- Editor of BPS Website - www.eBPS.org.uk:** A.C. Pigott, Kersey's Farm, Mendlesham, Stowmarket, Suffolk IP14 5RB;
E-mail: Webmaster@eBPS.org.uk
- Committee:** R.G. Ackers, A.R. Busby, Dr M. Hayward, Dr S.D. Martinelli, F. McGavigan, B.D. Smith, R.W. Sykes
- Booksales Organiser:** S.J. Munyard, 234 Harold Road, Hastings, East Sussex TN35 5NG; E-mail: Booksales@eBPS.org.uk
- Horticultural Information Officer and Archivist:** A.R. Busby, 16 Kirby Corner Road, Canley, Coventry CV4 8GD;
E-mail: HorticulturalInformation@eBPS.org.uk; Archives@eBPS.org.uk
- Merchandise Organisers:** Mr B.D. & Mrs G. Smith, Rookwood, 1 Prospect Rd, Oulton Broad, Lowestoft, Suffolk NR32 3PT; E-mail: Merchandise@eBPS.org.uk
- Plant Exchange Organiser:** R.G. Ackers, Deersbrook, Horsham Road, Walliswood, Surrey RH5 5RL;
E-mail: PlantExchange@eBPS.org.uk
- Spore Exchange Organisers:** Mr B. & Mrs A. Wright, 130 Prince Rupert Drive, Tockwith, York YO26 7PU;
E-mail: Spores@eBPS.org.uk
- Trustees of Greenfield & Centenary Funds:** Dr A.F. Dyer, Dr Y.C. Golding, Mrs G. Smith

The **BRITISH PTERIDOLOGICAL SOCIETY** was founded in 1891 and today continues as a focus for fern enthusiasts. It provides a wide range of information about ferns through the medium of its publications and other literature. It also organises formal talks, informal discussions, field meetings, garden visits, plant exchanges, a spore exchange scheme and fern book sales. The Society has a wide membership which includes gardeners, nurserymen and botanists, both amateur and professional. The Society's journals, the *Fern Gazette*, *Pteridologist* and *Bulletin*, are published annually. The *Fern Gazette* publishes matter chiefly of specialist interest on international pteridology, *Pteridologist*, topics of more general appeal, and the *Bulletin*, Society business and meetings reports. **Website:** <http://www.eBPS.org.uk>. Membership is open to all interested in ferns and fern allies.

SUBSCRIPTION RATES (due on 1st January each year) are Full Personal Members £20, Personal Members not receiving the *Fern Gazette* £16, Student Members £10, Subscribing Institutions £33. Family membership in any category is an additional £2. Applications for membership should be sent to the Membership Secretary (address above) from whom further details can be obtained. (Remittances made in currencies other than Sterling are £5 extra to cover bank conversion charges). **Airmail** postage for all journals is an extra £4, or for those not receiving the *Fern Gazette* £2.50. **Standing Order** forms are available from the Membership Secretary and the BPS web site.

Back numbers of the *Fern Gazette*, *Pteridologist* and *Bulletin* are available for purchase from P.J. Acock, 13 Star Lane, St Mary Cray, Kent BR5 3LJ; E-mail: BackNumbers@eBPS.org.uk.